## CONTENTS


Preface vii

Conference information ix

Contents to Parts I and II xi

Paper session index lxiii

**PART I: CONTRIBUTED PAPERS**

**1. Techniques and applications**

*1.1. Cryogenic detectors*

Towards the realisation of the first bolometer for $\beta\beta$ decay research
A. Alessandrello, C. Brofferio, D.V. Camin, O. Cremonesi, E. Fiorini, A. Giuliani and G. Pessina 1

A cryogenic phonon detector with simultaneous measurement of phonons and ionization
N. Wang, T. Shutt, A. Cummings, B. Sadoulet, E.E. Haller, P. Barnes, J. Emes, Y. Giraud-Héraud, A. Lange, J. Rich, R. Ross and C. Stubbs 3

Detection of particles by an $Al_2O_3/RuO_2$ composite bolometer
M. Chapellier, G. Chardin, M. Fouchier, H. Ji, J. Joffrin, J.Y. Prieur and F.B. Rasmussen 5

Observation of alpha-induced ballistic phonon time-of-flight using multi-channel silicon crystal acoustic detectors
B.A. Young, B. Cabrera and A.T. Lee 7

Niobium gravitational radiation antenna with superconducting parametric transducer
N.P. Linthorne, P.J. Veitch, D.G. Blair, P.J. Turner, M.E. Tobar and A.G. Mann 9

*1.2. Optical cooling*

Focusing of hydrogen atoms with a concave He-coated mirror
J.J. Berkhout, O.J. Luiten, I.D. Setija, T.W. Hijmans, T. Mizusaki and J.T.M. Walraven 11

The effect of thermal wavelength on the force experienced by an atom in an optical field
N.P. Bigelow and M.G. Prentiss 13

On the possibility of observing quantum reflection in the scattering of atoms from a nearly resonant light wave
N.P. Bigelow and M.G. Prentiss 15

The degenerate-internal-states approximation for cold collisions
A.C. Maan, E. Tiesinga, H.T.C. Stoof and B.J. Verhaar 17

Spin-exchange frequency shift of the cryogenic deuterium maser
E. Tiesinga, H.T.C. Stoof, B.J. Verhaar and S.B. Crampton 19

Unstable oscillation of the cryogenic H maser
A.C. Maan, H.T.C. Stoof, B.J. Verhaar and P. Mandel 21

*1.3. Thermometry*

A fast CMN thermometer with a wide temperature range
D.S. Greywall and P.A. Busch 23

Sol–gel derived glass capacitance sensors
P. Strehlow 25

The Korringa relation in semimetallic arsenic below 1 K
I.P. Goudemond, J.M. Keartland and M.J.R. Hoch 27

Thermometry below 1 K using NMR frequency pulling
M. Fujii 29

Consistency of low temperature scales and the temperature of the He-3 melting pressure minimum
G. Schuster, D. Hechtfischer, W. Buck and A. Hoffmann 31

Development of a temperature scale below 0.5 K
W.E. Fogle, J.H. Colwell and R.J. Soulen Jr. 33

The International Temperature Scale of 1990 at low temperatures
R.L. Rusby 35

Superconducting transition thermometry for $^4$He lambda point experiments
M. Larson and G. Ahlers 37

Granular nickel films as cryogenic thermometers
B.M. Patterson, J.R. Beamish and K.M. Unruh 39

An investigation on the thermoelectric properties of dilute magnetic copper–iron alloys at low temperature
H. Wang and H. Gao 41

*1.4. Refrigeration*

A small plastic dilution refrigerator
R. Wagner and G. Frossati 43

Dilution refrigerator to obtain polarized liquid $^3$He below 200 mK starting from optically oriented gas
G. Vermeulen and M. Cornut 45

Development of a compact dilution refrigerator with a cryogenic $^3$He $J$–$T$ circulation system for rapid cooling down and continuous operation
T. Igarashi, M. Sawano, Y. Karaki, M. Kubota, Y. Hiresaki, K. Akiyama and T. Shigi 47

A nuclear demagnetization cryostat for thermometry
W. Buck, D. Hechtfischer and A. Hoffmann 49

An ultra low temperature cryostat built with highly conductive copper
T. Arai, T. Igarashi, Y. Karaki, T. Kawae, M. Kubota, S. Ogawa, M. Sawano, K. Shirahama, W. Bergs, J. Hanssen and R.M. Mueller 51

Diffusion-welded laminar nuclear stage
Yu.M. Bunkov, V.V. Dmitriev, D.A. Sergatskov, A. Feher, E. Gažo and J. Nyéki 53

Rotating cryogenic platform
M.R. Ardron, P.G.J. Lucas, T. Onions, M.D.J. Terrett and M.S. Thurlow 55

Continuously pumped rotating millikelvin cryostat
J.D. Close, R.J. Zieve, J.C. Davis and R.E. Packard 57

An improved dilution refrigerator cold trap
E.N. Smith 59

*1.5. Superconducting junctions, SQUIDs, magnetometers and devices*

Frequency-determined current with a turnstile device for single electrons
V.F. Anderegg, L.J. Geerligs, J.E. Mooij, H. Pothier, D. Esteve, C. Urbina and M.H. Devoret 61

Single-electron tunneling in point-contact tunnel junctions
R.T.M. Smokers, P.J.M. van Bentum and H. van Kempen 63

Magnetic viscosity in RF SQUIDs coupled to ferromagnetic cores
M. Cerdonio, P. Falferi, G. Durin, A. Maraner, G.A. Prodi, R. Tommasini and S. Vitale 65

Noise and chaos in the RF SQUID
A.R. Bulsara, E.W. Jacobs and W.C. Schieve 67

High-$T_c$ superconducting diffusion type weak links
Z.G. Ivanov and T. Claeson 69

Fabrication and properties of YBCO/Ag/YBCO planar SNS junctions
D. Cohen and E. Polturak 71

Microwave response of YBaCuO/MgO/Pb planar Josephson tunnel junctions
I. Iguchi, Z. Wen and M. Furuyama 73

Performance of all-NbN superconductive tunnel junctions as mixers at 205 GHz
W.R. McGrath, J.A. Stern and H.G. LeDuc 75

Excess low-frequency flux noise in DC SQUIDs incorporating Nb/Al-oxide/Nb Josephson junctions
M.E. Huber and M.W. Cromar 77

DC SQUID with variable thickness bridge
H. Furukawa, S. Fujita, A. Matani, M. Yoshida and K. Shirae 79

Comparison of shunted DC-SQUIDs with large $\beta$
E.P. Houwman, D. Veldhuis, J. Flokstra and H. Rogalla 81

A new type of SQUID
G.S. Krivoy and V.A. Komashko 83

High temperature SQUID susceptometer and its applications
L. Zhou, J. Qiu, X. Zhang, Z. Tang, Y. Cai and Y. Qian 85

Gas floating technique for detection of trapped flux quanta
Q. Geng, H. Minami, K. Chihara, J. Yuyama and E. Goto 87

Principles of superconductor imaging surface gradiometry
D.B. van Hulsteyn, W.C. Overton Jr. and E.R. Flynn 89

Experiments on superconductor imaging surface magnetometry
W.C. Overton Jr., D.B. van Hulsteyn and E.R. Flynn 91

Laboratory tests of a mobile superconducting gravity gradiometer
F.J. van Kann, M.J. Buckingham, M.H. Dransfield, C. Edwards, A.G. Mann, R. Matthews, R.D. Penny and P.J. Turner 93

Design and construction of a 19-channel DC-SQUID neuromagnetometer
H.J.M. ter Brake, J. Flokstra, E.P. Houwman, D. Veldhuis, W. Jaszczuk, A. Martinez and H. Rogalla 95

A 24-SQUID gradiometer for magnetoencephalography
S. Ahlfors, A. Ahonen, G. Ehnholm, M. Hämäläinen, R. Ilmoniemi, M. Kajola, M. Kiviranta, J. Knuutila, O.V. Lounasmaa, J. Simola, C. Tesche and V. Vilkman 97

Multichannel DC SQUID system with two stage configuration
H. Furukawa, S. Fujita, A. Matani, M. Yoshida and K. Shirae 99

Thermal effects on the Josephson series-array voltage standard
R.V. Duncan 101

Josephson tunnel junction coupled to superconducting thin-film resonator
A. Larsen, H. Dalsgaard Jensen and J. Mygind 103

Synchronization of radiating intrinsic high-$T_c$ Josephson junctions
G. Jung, J. Konopka and S. Vitale 105

Millimeter wave detectors based on future thin film high-$T_c$ Josephson junctions
N.F. Pedersen 107

Signal processing for SQUID-magnetometry of high-$T_c$ single crystals
W. Kritscha, F.M. Sauerzopf and H.W. Weber 109

Systematic studies of the effect of a post-detection filter on a Josephson-junction noise thermometer
R.J. Soulen Jr., W.E. Fogle and J.H. Colwell 111

Correlation of flux states generated by optical switching of a superconducting circuit
C.E. Cunningham, G.S. Park, B. Cabrera and M.E. Huber 113

Sputtered YBCO film bolometers
S.J. Rogers, A.S.S. Al-Ameer and J.F. Lanchberry 115

Chaos in a superconducting saucer
G. Davies, C.J. Lambert, N.S. Lawson, R.A.M. Lee, R. Mannella, P.V.E. McClintock and N.G. Stocks 117

*1.6. Miscellaneous techniques*

Viscometer utilizing a floating charged magnetic particle
K. Gloos, J.H. Koivuniemi, W. Schoepe, J.T. Simola and J.T. Tuoriniemi 119

Time-of-flight spectrometer for measuring the viscosity of fluids by using charged microparticles
J.T. Simola and J.T. Tuoriniemi 121

Bonding Si wafers at uniform separation
I. Rhee, A. Petrou, D.J. Bishop and F.M. Gasparini 123

Anomalous low temperature mechanical properties of single-crystal silicon
R.E. Mihailovich and J.M. Parpia 125

High-resolution acoustic measurements by path length modulation
P.J. Hamot, H.H. Hensley, Y. Lee and W.P. Halperin 127

Oscillatory He II mass flow behaviour of FEPs in self-sustained mode
S. Kasthurirengan, S. Jacob, R. Karunanithi and A. Hofmann 129

Observation of new nonlinear phenomena in focused acoustic beam in pressurized superfluid helium-4
K. Karaki, T. Saito, K. Matsumoto and Y. Okuda 131

High resolution calorimetry in liquid helium
G.K.S. Wong, P.A. Crowell, H.A. Cho and J.D. Reppy 133

Capture of foreign atoms by helium clusters
A. Scheidemann, B. Schilling, J.P. Toennies and J.A. Northby 135

Optical spectroscopy of alkali and alkali-like ions in superfluid $^4$He
H. Bauer, M. Beau, J. Fischer, H.J. Reyher, J. Rosenkranz and K. Venter 137

A heat switch at very low temperature and high magnetic field
S.A.J. Wiegers, P.E. Wolf and L. Puech 139

Digital bridge for ultralow temperature thermometry
I. Hahn and C.M. Gould 141

High resolution DC size effect measurements of resistivity in aluminium up to 30 K using RF SQUID and HTSC wiring
J. Romero, T. Fleischer and R. Huguenin 143

A very high stability sapphire loaded superconducting cavity oscillator
A.J. Giles, A.G. Mann, S.K. Jones, D.G. Blair and M.J. Buckingham 145

Magnetic susceptibility of instrument materials below 10 K
J.M. Lockhart, R.L. Fagaly, L.W. Lombardo and B. Muhlfelder 147

Low frequency AC shielding effectiveness of a bulk normal metal/high-$T_c$ superconducting composite
J.J. Calabrese and J.C. Garland 149

Low field flux creep in niobium superconducting wires
A.G. Mann, N.J. McDonald and F.J. van Kann 151

A mechanism for precise rotation of nuclear targets at low temperatures
J.E. Koster, C.R. Gould, D.G. Haase and N.R. Roberson 153

An ultra high vacuum low temperature gyroscope clock
T. Walter, J.P. Turneaure, S. Buchman, C.W.F. Everitt and G.M. Keiser 155

Test of the equivalence principle for nuclear-polarized bodies at low temperature
W.-T. Ni 157

Multipurpose closed-cycle cryocooler for liquefying hydrogen, helium-4 or helium-3
C. Winter 159

Cleaner catalyst for the para to ortho conversion in high purity deuterium at low temperatures
D.I. Head and R.L. Rusby 161

The effects of exchange gas temperature and pressure on the beta-layering process in solid deuterium–tritium fusion fuel
J.K. Hoffer, L.R. Foreman, J.D. Simpson and T.R. Pattinson 163

Surface tension of liquid $N_2$ near the liquid–vapor critical point
A. Shimoyanagita, N. Itagaki, A. Sato and M. Suzuki 165

Imaging of spatial structures of Fiske-, Shapiro-, and photon-assisted tunnelling step rates in Josephson tunnel junctions
T. Doderer, B. Mayer, C. Kruelle, R.P. Huebener, D. Quenter, J. Niemeyer, R. Fromknecht, R. Poepel, A.V. Ustinov, U. Klein and J.H. Hinken 167

**2. Metals and magnetism**

*2.1. Magnetism*

The angular dependence of the magnetic phase diagram of $CsMnBr_3$
A. Caille, M.L. Plumer, M. Poirier and B.D. Gaulin 169

Ultrasonic study of quasi one-dimensional magnetic system $CsMnBr_3$
M. Poirier, M. Castonguay, A. Caille, M.L. Plumer and B.D. Gaulin 171

Effect of field-induced order on the ground state of a singlet ground state system
J.R. Fletcher, S.S.U. Kazmi, K.J. Maxwell and J.R. Owers-Bradley 173

The accurate expression of the ground state for square lattice $S=1/2$ Heisenberg antiferromagnet by RVB-strings spreading over any Nth.N.N.
Y. Natsume, T. Hamada, S. Nakagawa, J. Kane and M. Katagiri 175

Pulsed NMRON relaxation measurements and thermometric NMR in the quasi 2-dimensional ferromagnet: $Mn(COOCH_3)_2 \cdot 4H_2O$
M. Le Gros, A. Kotlicki and B.G. Turrell 177

Net spontaneous magnetisation in the dilute Ising antiferromagnet $Fe_{0.46}Zn_{0.54}F_2$
M. Lederman, J. Hammann and R. Orbach 179

Magnetic hysteresis behaviour of anisotropic spin glass $FeMnTiO_5$
J.K. Srivastava, K. Asai and K. Katsumata 181

Dynamic scaling in the Ising re-entrant spin glass $Fe_{0.62}Mn_{0.38}TiO_3$
J.-O. Andersson, K. Gunnarsson, P. Svedlindh, P. Nordblad, L. Lundgren, H. Aruga and A. Ito 183

Time resolved specific heat of the insulating spin-glass $Eu_{0.4}Sr_{0.6}S$
C. Pappas, M. Meissner, G. Schmidt and N. Bontemps 185

On the magnetic ordering in amorphous and quasi-crystalline Al–Mn phases
J.C. Lasjaunias, M. Godinho and C. Berger 187

A possible Fermi liquid regime in CuMn and similar spin glass alloys
S. Hershfield 189

Critical dynamics of AuFe re-entrant ferromagnets close to the percolation threshold
C. Pappas, C. Lartigue, M. Alba and F. Mezei 191

Magnetic and electron spin resonance studies of $(Ce_{1-c}Gd_c)Rh_2$
A. Tari 193

The effects of hydrogen on the low temperature magnetic properties of PdNi
Z. Wang, H.P. Kunkel and G. Williams 195

Moment–volume instabilities in fcc Fe-based alloys
M.M. Abd-Elmeguid, A. Block and H. Micklitz 197

Thermal spontaneous ferromagnetism of $TiBe_{2-x}Cu_x$
D.M. Ioshpe 199

The low temperature magnetization of $ZrZn_2$
S.M. Hayden and C.C. Paulsen 201

Quenching of spin fluctuations by high magnetic fields in heat capacity of $Zr_{1-x}Hf_xZn_2$
K. Ikeda, M. Yoshizawa, K. Kai and T. Nomoto 203

Anomalous diamagnetism at the twinning plane
S.N. Burmistrov and L.B. Dubovskii 205

Low-temperature lattice properties of transition metals: pseudopotential model coupled with band structure calculation
V.Yu. Milman, V.N. Antonov and V.V. Nemoshkalenko 207

The Sherrington–Kirkpatrick Ising spin glass in a transverse field: stability analysis and breaking of the replica symmetry
G. Büttner and K.D. Usadel 209

Slow relaxation of diluted antiferromagnets
U. Nowak and K.D. Usadel 211

Dimerisation in frustrated antiferromagnets
N. Joad and G.A. Gehring 213

Monte Carlo studies of critical phenomena near a Lifshitz point in an Ising ferromagnet with dipolar interaction
S. Watarai 215

Electrical properties of thulium thin films at low temperatures
J. Dudáš, D. Knežo, A. Feher and H. Ratajczak 217

Absence of resonant scattering in mixed valent $Hg_{1-x}Fe_xSe$
A. Lenard, M. Arciszewska, T. Dietl, M. Sawicki, W. Plesiewicz, T. Skośkiewicz, W. Dobrowolski and K. Dybko 219

Low temperature magnetic and thermal properties of $Ce(CF_3SO_3)_3 \cdot 9H_2O$
G.H. Bellesis, S. Simizu and S.A. Friedberg 221

Quantum *XY* and Heisenberg models on the planar lattices – the renormalization group approach
A. Drzewiński and J. Sznajd 223

Neutron diffraction study of the ferromagnetic spinel $LiZn_{0.5}Mn_{1.5}O_4$
R. Plumier and M. Sougi 225

$^{151}Eu$ and $^{119}Sn$ Mössbauer studies in $SnEu_3Rh_4Sn_{12}$
G. Balakrishnan, R. Nagarajan, S.K. Paghdar, L.C. Gupta and R. Vijayaraghavan 227

On the coexistence of low- and high-spin states in transition metal systems
M. Schröter and P. Entel 229

Cross-relaxation in paramagnetic crystals at low temperatures
D.A. Tayurskii 231

Linear upturn in the low-temperature resistivity of a non-re-entrant amorphous Ni–Fe–Si–B spin glass
G. Thummes, R. Carloff and J. Kötzler 233

Inelastic light-scattering in $Cd_{0.95}Mn_{0.05}Se$:In near the metal-to-insulator transition
E.D. Isaacs, T. Dietl, M. Sawicki, D. Heiman, M. Dahl, M.J. Graf, S.I. Gubarev and D.L. Alov 235

High field magnetization of one-dimensional Ising antiferromagnets $CsCoCl_3$, $CsCoBr_3$ and $RbCoCl_3$
H. Hori, H. Mikami, M. Date and K. Amaya 237

The theory of spin fluctuations in medium and highly Stoner-enhanced paramagnetic metals
H. Winter, Z. Szotek and W.M. Temmerman 239

The possibility of surface spins' quantization axes resolution by means of scanning tunneling microscope with magnetic tip
A.A. Minakov and I.V. Shvets 241

Low temperature antiferromagnetic domains dynamics in helical antiferromagnets
A.A. Minakov, I.V. Shvets and V.G. Veselago 243

Commensurability effects and electron structures of heavy rare earth metals
L.A. Boyarsky 245

*2.2. Electrons in metals*

Very low temperature thermoelectric ratio of KRb, KNa, and LiMg alloys
J. Zhao, Z.-Z. Yu, H. Sato, W.P. Pratt Jr., P.A. Schroeder and J. Bass 247

Explanation for the anomalous electrical resistivity data for thin wires of potassium below 1 K
D. Movshovitz and N. Wiser 249

Dislocation-enhanced electron–electron scattering in the resistivity of copper
J. Sprengel and G. Thummes 251

Scattering rates in cadmium from radio-frequency size-effect measurements below 1 K
A. Jaquier, L. Patthey, R. Huguenin and P.-A. Probst 253

Nonlinear Doppler-shifted cyclotron resonance in metals
I.F. Voloshin, N.A. Podlevskikh, V.G. Skobov, L.M. Fisher and A.S. Chernov 255

The galvanomagnetic properties of compensated metals under conditions of a strong static skin effect
A.N. Cherepanov, V.V. Marchenkov and V.E. Startsev 257

An application of new transport equation to dilute alloys
L. Yi and K.-L. Yao 259

Low temperature Hall conductivity of dilute alloys
K.-L. Yao and L. Yi 261

"Laminar" and "turbulent" direct current flow in thin metal plates
L.M. Fisher, S.V. Kravchenko, N.A. Podlevskikh, I.F. Voloshin and S.I. Zakharchenko 263

Low-temperature conductivity of thin metallic slabs at arbitrary Fuchs boundary conditions
J. Czerwonko 265

Effect of electron entrainment at low temperature deformation of metals: kinetics and statistics of dynamical processes
M.A. Lebyodkin, V.Ya. Kravchenko and V.S. Bobrov 267

Electron–hole correlation in giant quantum attenuation of sound waves in bismuth
M. Mori, M. Koga and N. Goto 269

De Haas–Van Alphen effect in $Pd_2Si$
E.G. Haanappel, W. Joss, R. Madar and A. Rouault 271

Skew scattering effect on the Hall conductance fluctuation in the high-$T_c$ superconductors
A.G. Aronov and S. Hikami 273

On the self-interaction correction of localized bands: application to the 4p semi-core states in Y
Z. Szotek, W.M. Temmerman and H. Winter 275

Static skin effect at high current densities
K. Oyamada, V.G. Peschansky and D.I. Stepanenko 277

*2.3. Localization*

Nonlinear response of a mesoscopic system
J. Liu and N. Giordano 279

Modification of weak localization in thin annealed Pd films
N. Papandreou and P. Nedellec 281

Anomalous transport and magnetic properties of $Al_{63}Cu_{25}Fe_{12}$ icosahedral single grains
T. Klein, A. Gozlan, C. Berger, F. Cyrot-Lackmann, Y. Calvayrac, A. Quivy and G. Fillion 283

Magnetic field dependence of the specific heat of Si:P near the metal–insulator transition
H. v. Löhneysen and M. Lakner 285

Magnetoresistance and weak localisation of amorphous $Cu_{65}Ti_{35}$
P. Lindqvist 287

Contributions to the diffusion thermopower of amorphous $Cu_xSn_{100-x}$ and $Mn_{70}Zn_{30}$ films
C. Lauinger, J. Feld, E. Compans, P. Häussler and F. Baumann 289

Low temperature resistivity anomaly in TiNb and TiV alloys
T. Sasaki and Y. Muto 291

Temperature and magnetic field dependence of resistance in Zr–N sputtered films
M. Yoshizawa, K. Ikeda, N. Toyota, T. Yotsuya, T. Müller and P. Wyder 293

Structural disorder and incipient localization effects in NbC thin films
Y. Kuwasawa, S. Hino, S. Nakano, A. Koyama and T. Matsushita 295

Magnetoresistance in the incipient Anderson localization region for granular $Pd_xC_{1-x}$ films
A. Carl, G. Dumpich and E.F. Wassermann 297

Conduction mechanism in granular $RuO_2$-based thick-film resistors
W. Schoepe 299

Magnetoconductivity of metallic InSb in the extreme quantum limit
S.S. Murzin, A.G.M. Jansen and U. Zeitler 301

Electrical transport in As ion-implanted Si in the metal–insulator transition range
C. Gang, R.W. van der Heijden, A.Th.A.M. de Waele, H.M. Gijsman and F.P.B. Tielen 303

The $^{29}Si$ Knight shift in Si:P and Si:P, B in the vicinity of the metal–insulator transition
M.J.R. Hoch, U. Thomanschefsky and D.F. Holcomb 305

Anomalous behavior of discrete resistance fluctuation lifetimes in novel metal–insulator–metal tunnel junctions
X. Jiang and J.C. Garland 307

On the scaling theory of the Mott transition
M.A. Continentino 309

Resistance scaling in inhomogeneous media in the vicinity of a metal–insulator transition
O.I. Barkalov, I.T. Belash, S.E. Esipov, V.F. Gantmakher, E.G. Ponyatovskii and V.M. Teplinskii 311

The range of the dynamical Coulomb interaction in junctions of thin disordered films
G. Bergmann and W. Wei 313

Disorder-averaging and the dynamic nonlinear $\sigma$-model of localization theory
M. Horbach and G. Schön 315

Variable range hopping conductivity in Si:As bolometers
C.C. Zammit, A.D. Caplin, M.J. Lea, P. Fozooni, J. Kennefick and J. Saunders 317

*2.4. Heavy fermions: superconductivity*

Strong coupling D-wave superconductivity stabilized by antiferromagnetic spin fluctuations
E. Schachinger and J.P. Carbotte 319

Observation of magnetic order in the heavy fermion superconductor $UBe_{13}$
R.N. Kleiman, D.J. Bishop, H.R. Ott, Z. Fisk and J.L. Smith 321

Magnetic oscillation phenomena in the heavy fermion superconductor $CeCu_2Si_2$
M. Hunt, P. Meeson, P.-A. Probst, P. Reinders, M. Springford, W. Assmus and W. Sun 323

Features in the upper critical field of $UBe_{13}$: evidence for two new phase transitions
G.M. Schmiedeshoff, R.T. Tisdale, J.A. Poulin, S. Hashmi and J.L. Smith 325

Fermi surface of $CeSn_3$
A. Hasegawa and H. Yamagami 327

De Haas–Van Alphen effect in $CeCu_2$
K. Satoh, I. Umehara, Y. Kurosawa and Y. Ōnuki 329

Magnetoresistance and De Haas–Van Alphen effect in $CeIn_3$
I. Umehara, Y. Kurosawa, M. Kikuchi, N. Nagai, K. Satoh and Y. Ōnuki 331

Fermi surface in $CeSn_3$
Y. Ōnuki, I. Umehara, Y. Kurosawa, N. Nagai, M. Kikuchi and K. Satoh 333

On the Fermi surface of $CeAl_2$
G.Y. Guo 335

Phase diagram of $CeCu_2Si_2$ in the $B$–$T$ plane
M. Hunt, P. Meeson, P.-A. Probst, P. Reinders, M. Springford, W. Assmus and W. Sun 337

De Haas–Van Alphen effect in $LaGa_2$ and $SmGa_2$
I. Sakamoto, T. Miura, K. Miyoshi and H. Sato 339

Energy band calculation of $LaCu_6$
H. Harima, A. Yanase and A. Hasegawa 341

Fermi surfaces of $Ub_{12}$
H. Harima, A. Yanase, Y. Ōnuki, I. Umehara, Y. Kurosawa, N. Nagai, K. Satoh, M. Kasaya and F. Iga 343

Superconducting lower critical fields in $UPt_3$
Z. Zhao, F. Behroozi, J.B. Ketterson, Y. Guan, B.K. Sarma and D.G. Hinks 345

Stability of doubly quantized vortices in unconventional superconductors
T.A. Tokuyasu and J.A. Sauls 347

Magnetization and sound velocity measurements near the antiferromagnetic transition in the heavy fermion system $UPt_3$
S. Adenwalla, S.W. Lin, Q.Z. Ran, J.-Q. Zheng, M.-F. Xu, K.J. Sun, D.G. Hinks, J.B. Ketterson, M. Levy and B.K. Sarma 349

Phase diagram of superconducting $UPt_3$
S. Adenwalla, Z. Zhao, J.B. Ketterson, M. Levy and B.K. Sarma 351

Specific heat of non-stoichiometric, non-superconducting $CeCu_2Si_2$ under pressure
A. Eichler, K.-R. Harms and F.-W. Schaper 353

Anisotropic field dependence of thermal conductivity in superconducting $UPt_3$
K. Behnia, L. Taillefer, J. Flouquet, D. Jaccard and Z. Fisk 355

The phase diagram of superconducting $UPt_3$ for $B \| c$
K. Hasselbach, L. Taillefer and J. Flouquet 357

Magnetoresistance of thoriated $UBe_{13}$
B.A. Allor, M.J. Graf, J.L. Smith and Z. Fisk 359

Re-entrance of the superconducting state in a strong magnetic field
T. Maniv, R.S. Markiewicz, I.D. Vagner and P. Wyder 361

The upper critical field of superconducting $UPt_3$ alloyed with boron
T. Vorenkamp, A. de Visser, R. Wester, A.A. Menovsky and J.J.M. Franse 363

Very strong flux motion at millikelvin temperatures in the heavy fermion superconductor $UPt_3$
A. Pollini, A.C. Mota, P. Visani, G. Juri and J.J.M. Franse 365

Superconducting phases in $UPt_3$
D. Maurer, V. Müller, E.-W. Scheidt and K. Lüders 367

Ultrasonic study of the superconducting phases in heavy fermion compounds
G.J.C.L. Bruls, D. Weber, B. Wolf, B. Lüthi, A.A. Menovsky, A. de Visser and J.J.M. Franse 369

Electromagnetic response in the $E_{1g}$ model state for the heavy fermion superconductor $UPt_3$
W.O. Putikka, P.J. Hirschfeld and P. Wölfle 371

$H_{c2}(T)$ for the heavy-fermion superconductor $U_{1-x}Th_xBe_{13}$ with $0.00 \leq x \leq 0.06$
E.A. Knetsch, J.A. Mydosh, R.H. Heffner and J.L. Smith 373

Thermal expansion of heavy-fermion superconductors
A. de Visser, F.E. Kayzel, A.A. Menovsky, J.J.M. Franse, K. Hasselbach, A. Lacerda, L. Taillefer, J. Flouquet and J.L. Smith 375

RF penetration depth in superconducting $UPt_3$ with double heat capacity anomaly
S.E. Brown, H. Li, M.W. Meisel, J.L. Smith, A.L. Giorgi and J.D. Thompson 377

Thermodynamic properties of superconducting single crystalline $CeCu_2Si_2$
W. Assmus, W. Sun, G. Bruls, D. Weber, B. Wolf, B. Lüthi, M. Lang, U. Ahlheim, A. Zahn and F. Steglich 379

$^{195}Pt$ study in $UPt_3$ and $U(Pt–Pd)_3$
Y. Kohori, M. Kyogaku, T. Kohara, K. Asayama, H. Amitsuka and Y. Miyako 381

Characteristic temperatures in the heavy-fermion system $U(Pt, Pd)_3$
J.J.M. Franse, H.P. van der Meulen and A. de Visser 383

Low temperature specific heat of $URu_2Si_2$ near the superconducting transition
M.A. López de la Torre, S. Vieira, R. Villar, M.B. Maple and M.S. Torikachvili 385

*2.5. Heavy fermions: strong correlations*

Magnetism and phase diagram of heavy-fermion compounds
B. Welslau and N. Grewe 387

Magnetic field dependence of the specific heat of heavy-fermion $YbCu_{4.5}$
A. Amato, R.A. Fisher, N.E. Phillips, D. Jaccard and E. Walker 389

Local holon and spinon in the Anderson model
N. Kawakami and A. Okiji 391

Numerical study of slave boson mean field equations for the Hubbard model
L. Lilly, A. Muramatsu and W. Hanke 393

Amplitude relations near a zero temperature transition
M.A. Continentino 395

Ground state of the Kondo lattice
K. Ueda and K. Yamamoto 397

Numerical calculations of susceptibility for two-impurity Anderson model
T. Yanagisawa 399

Correlated lattice electrons: exact mean field description in infinite dimensions
P. van Dongen and D. Vollhardt 401

Hubbard model in high dimensions: a perturbation expansion about the atomic limit
W. Metzner 403

Study of two-impurity Kondo problem by self-consistent perturbation approach
T. Saso 405

The static interacting susceptibility of $UPt_3$ and $CeAl_3$
H.D. Langford and W.M. Temmerman 407

On the dynamic susceptibility of heavy fermion compounds
J. Choi and G.A. Gehring 409

Strongly correlated fermions in 2D: variational Monte Carlo study of magnetism and supraconductivity
T. Giamarchi and C. Lhuillier 411

A theoretical study of the anisotropic susceptibility and resistivity in heavy fermion compounds
S.M.M. Evans, A.K. Bhattacharjee and B. Coqblin 413

Weak-coupling treatment of correlated electron systems in finite dimensions
H. Schweitzer and G. Czycholl 415

Spin dynamics in Kondo systems at low temperatures
N.G. Fazleev and G.I. Mironov 417

High-field Hall effect and crystal orientation dependence of magnetoresistance in thin films of $CeAl_3$
G.M. Roesler Jr. and P.M. Tedrow 419

Elastic properties of heavy-electron compound CePdIn
T. Suzuki, M. Nohara, T. Fujita, T. Takabatake and H. Fujii 421

Sound velocity and magnetization measurements near the antiferromagnetic transition in the heavy fermion system $URu_2Si_2$
S.W. Lin, S. Adenwalla, Q.Z. Ran, K.J. Sun, D.G. Hinks, J.B. Ketterson, M. Levy and B.K. Sarma 423

Pressure dependence of the specific heat of heavy-fermion $YbCu_{4.5}$
A. Amato, R.A. Fisher, N.E. Phillips, D. Jaccard and E. Walker 425

Magnetic order in the heavy fermion system $Ce(Cu_{1-x}Ni_x)_2Ge_2$
G. Sparn, C. Geibel, S. Horn, M. Lang, F. Steglich, A. Krimmel and A. Loidl 427

Electronic transport properties of $UCu_{4+x}Al_{8-x}$ at low temperatures
R. Köhler, C. Geibel, S. Horn, B. Strobel, S. Arnold, G. Sparn, A. Höhr, C. Kämmerer and F. Steglich 429

Magnetism and linear field magnetoresistivity in $UPt_3$
K. Behnia, O. Laborde, L. Taillefer and J. Flouquet 431

Low temperature properties of heavy-fermion $CeRu_2Si_2$ studied by magnetization experiments
C. Paulsen, A. Lacerda, J.L. Tholence and J. Flouquet 433

Anisotropic transport and magnetic properties of $Fe_2P$-type heavy fermions CePdIn and UPdIn
H. Fujii, M. Nagasawa, H. Kawanaka, T. Inoue and T. Takabatake 435

Semiconducting and heavy-fermion behavior in new class of materials of $U_3T_3X_4$
T. Takabatake, S. Miyata, H. Fujii, Y. Aoki, T. Suzuki and T. Fujita 437

Magnetic susceptibility of $UPt_3$ in high magnetic fields
T. Müller, W. Joss and L. Taillefer 439

High field specific heat of single-crystalline $U(Pt_{0.95}Pd_{0.05})_3$
H.P. van der Meulen, J.J.M. Franse, A. de Visser, J.A.A.J. Perenboom and H. van Kempen 441

Critical magnetic behaviors in $CeRuSn_x$ ($2.85 \leq x \leq 3.15$)
T. Fukuhara, I. Sakamoto and H. Sato 443

Magnetic and transport properties of new uranium compounds $U_3Sn_5$ and $URuSn_x$
H. Sato, T. Fukuhara, I. Sakamoto and Y. Ōnuki 445

Heavy fermion behaviour in $CeRuSn_3$ compound
S. Takayanagi, T. Fukuhara, H. Sato, N. Wada and Y. Yamada 447

*2.6. Superconducting and magnetic multilayer structures*

Two-dimensional ferromagnetism in metallic films
E.V. Lins de Mello and M.A. Continentino 449

Spin waves at the ferromagnetic–antiferromagnetic interface
E. Pestana, G.J. Mata and N. Pantoja 451

Perpendicular resistance of thin Co films in contact with superconducting Nb
C. Fierz, S.-F. Lee, J. Bass, W.P. Pratt Jr. and P.A. Schroeder 453

Thickness dependence of the Kondo effect in AuFe films
G. Chen and N. Giordano 455

Magnetic properties of Nb/CuMn multilayer systems
M.L. Wilson, R. Loloee and J.A. Cowen 457

"Universality" of finite size effects in CuMn and AgMn spin glasses
R. Stubi, J.A. Cowen, D. Leslie-Pelecky and J. Bass 459

2D and 3D spin glass dynamics in thin Cu(Mn) films
J. Mattsson, P. Granberg, P. Nordblad, L. Lundgren, R. Stubi, D. Leslie-Pelecky, J. Bass and J.A. Cowen 461

Magnetic re-entrant behavior of PdFe-films due to disorder
P. Brüll and P. Ziemann 463

Crossover behaviour in magnetic heat capacity of layered molybdates below $T_c$
P. Stefányi and A. Feher 465

Superconductive tunneling study of the spin-filter and proximity effects
X. Hao, J.S. Moodera and R. Meservey 467

Critical field anisotropy of artificial $YBa_2Cu_3O_7/PrBa_2Cu_3O_7$ superlattices
O. Brunner, J.-M. Triscone, L. Antognazza, M.G. Karkut and Ø. Fischer 469

Superconducting critical temperatures of artificial $YBa_2Cu_3O_7/PrBa_2Cu_3O_7$ superlattices
L. Antognazza, J.-M. Triscone, O. Brunner, M.G. Karkut and Ø. Fischer 471

Anisotropy and magnetic field dependence of critical currents in Pb/Ge multilayers
D. Neerinck, K. Temst, M. Dhalle, C. van Haesendonck, Y. Bruynseraede, A. Gilabert, I.K. Schuller, T. Krekels and G. van Tendeloo 473

Parallel critical fields in $Nb/Nb_{0.6}Zr_{0.4}$ multilayers
J. Aarts, K.-J. de Korver, W. Maj and P.H. Kes 475

Anomalous upper critical fields of superconducting $Nb/Nb_{0.5}Zr_{0.5}$ multilayers
Y. Kuwasawa, T. Tosaka, A. Uchiyama, Y. Hayano and S. Nakano 477

Vertical resistive transition in Si/Nb multilayers
S.N. Song and J.B. Ketterson 479

Energy gap of proximity-effect-induced superconductivity in Nb–Cu multilayers
G.-q. Zheng, Y. Kitaoka, Y. Oda, Y. Kohori, K. Asayama, Y. Obi, H. Fujimori and R. Aoki 481

Aluminum thin films with in-plane modulated superconducting structures
K. Lin, Y.K. Kwong, M. Isaacson and J.M. Parpia 483

**3. Quantum fluids and solids**

*3.1. Excitations in $^4He$*

Temperature dependence of energy and lifetime of rotons determined by Raman scattering
K. Ohbayashi, M. Udagawa, H. Yamashita, M. Watabe and N. Ogita 485

New interpretation of the quasiparticle weight $Z(Q)$ for superfluid $^4He$
A. Griffin and E.C. Svensson 487

Rotating superfluid $^4He$ clusters
L. Pitaevskii and S. Stringari 489

Possibilities for Bose condensation of positronium (Ps)
P.M. Platzman and A. Mills Jr. 491

Time of flight of phonon–atom quantum evaporation signals
M.A.H. Tucker and A.F.G. Wyatt 493

Generating beams of high energy phonons and rotons in liquid $^4He$
A.F.G. Wyatt and M. Brown 495

A direct comparison of the scattering of phonons and rotons from rotons in superfluid $^4He$
A.C. Forbes and A.F.G. Wyatt 497

Dynamical structure factor $S(k,\omega)$ in He II at finite temperature
K. Ishikawa and K. Yamada 499

Multiphonon scattering from superfluid $^4$helium
W.G. Stirling 501

Phonon contribution and 2-roton Raman spectrum of He II
N. Ogita, M. Watabe, M. Udagawa and K. Ohbayashi 503

Ripplon-limited mobilities of ions trapped below the surface of superfluid $^4$He
J. Meredith, C.M. Muirhead, P.K.H. Sommerfeld and W.F. Vinen 505

Superfluidity of liquid helium as a consequence of non-linearity of energy spectrum
S. Sasaki 507

Bose–Einstein condensation in a random potential
D.K.K. Lee and J.M.F. Gunn 509

Sum rules and the spectral fuction of superfluid $^4$He
S. Giorgini and S. Stringari 511

Possibility of stable but inaccessible states in theory of superfluidity
W.A.B. Evans 513

Liquid $^4$He: a density functional approach with a finite range interaction
J. Dupont-Roc, M. Himbert, N. Pavloff and J. Treiner 515

*3.2. $^3$He–$^4$He mixtures*

Solubility of $^4$He in liquid $^3$He at very low temperatures
M. Nakamura, G. Shirota, T. Shigematsu, K. Nagao, Y. Fujii, M. Yamaguchi and T. Shigi 517

Experimental measurements of the attenuation of second sound in ultra dilute $^3$He–$^4$He mixtures
J.R. Smith and A. Tyler 519

Codimension-two and hydrodynamic tricritical points in $^3$He–$^4$He mixtures
T. Onions, M.R. Ardron, P.G.J. Lucas, M.D.J. Terrett and M.S. Thurlow 521

Magnetic Kapitza resistance between enhanced nuclear spin system and liquid $^3$He
N. Mizutani, H. Suzuki and M. Ono 523

Kapitza resistance between silver and $^3$He at millikelvin temperatures
G.J. Stecher, Y. Hu, T.J. Gramila and R.C. Richardson 525

Kapitza resistance between $^3$He–$^4$He dilute solution and metal fine powder below 1 millikelvin
G.-H. Oh, M. Nakagawa, H. Akimoto, O. Ishikawa, T. Hata and T. Kodama 527

Kapitza resistance at the solid–liquid interface in $^3$He
J. Amrit and J. Bossy 529

Excitation spectrum and dynamic structure function of $^4$He clusters
S.A. Chin and E. Krotschek 531

*3.3 Critical phenomena, restricted geometries and surfaces*

Measurements of the Kapitza boundary resistance between copper and helium above the lambda transition
Q. Li, T.C.P. Chui and J.A. Lipa 533

Scaling the superfluid density of $^4$He confined in planar geometry
I. Rhee, D.J. Bishop and F.M. Gasparini 535

Superfluid density in metastable $^3$He–$^4$He mixtures
J. Bodensohn and P. Leiderer 537

Quantitative studies of nonlinear second sound near $T_\lambda$
L.S. Goldner, G. Ahlers and R. Mehrotra 539

Quantum nucleation and dissipation in the phase separation of supersaturated liquid $^3$He–$^4$He solution at low temperatures
S.N. Burmistrov and L.B. Dubovskii 541

Critical thermal resistance of confined $^4$He above $T_\lambda$
D. Frank and V. Dohm 543

Kosterlitz–Thouless superfluid transition in $^4$He films adsorbed on porous glasses
K. Shirahama, M. Kubota, S. Ogawa, N. Wada and T. Watanabe 545

Simultaneous measurement of the heat capacity and superfluid density of $^4$He films in Vycor glass
S.Q. Murphy and J.D. Reppy 547

Measurement of the superfluid density in silica aerogels
P.A. Crowell, G.K.S. Wong and J.D. Reppy 549

The melting properties of helium on two different surfaces
D.F. Brewer, J. Rajendra, N. Sharma, A.L. Thomson and J. Xin 551

The effect of $^4$He on the relaxation rates of the two-level systems in porous Vycor glass
N. Mulders and J.R. Beamish 553

Fluid slip at walls with mesoscopic surface roughness
P. Panzer, D. Einzel and M. Liu 555

Fluctuation theory of the critical Kapitza resistance near the lambda point of liquid helium
R.A. Ferrell 557

Critical dynamics in $^3$He–$^4$He mixtures above $T_\lambda$
G. Moser and R. Folk 559

Boundary effects in second sound near $T_\lambda$
D.R. Swanson, T.C.P. Chui, K.W. Rigby and J.A. Lipa 561

Critical shear viscosity of $^4$He above and below $T_\lambda$
R. Schloms, J. Pankert and V. Dohm 563

The effects of gravity in second sound
T.C.P. Chui and D.R. Swanson 565

Immiscibility of bulk liquid $^3$He with $^3$He contained in a porous glass
G.G. Ihas and G.F. Spencer 567

Low temperature hydrogen which has not solidified
D.F. Brewer, J. Rajendra, N. Sharma and A.L. Thomson 569

Heat capacities of $^3$He and $^4$He in one- and three-dimensional channels
H. Deguchi, K. Konishi, K. Takeda and N. Uryu 571

Critical behavior of superfluid $^4$He in porous alumina
J.R. Beamish and K. Warner 573

Specific heat and superfluid density of confined $^4$He near $T_\lambda$
R. Schmolke, A. Wacker, V. Dohm and D. Frank 575

The thermal properties of helium confined in small geometries
D.F. Brewer, J. Rajendra, N. Sharma, A.L. Thomson and J. Xin 577

Universal effect of surface roughness on the critical current of superfluid $^4$He in narrow pores
M.W. Meisel and P. Kumar 579

Second and fourth sound modes for superfluid helium in aerogel
M.J. McKenna, T.M. Slawecki and J.D. Maynard 581

Superfluid transition of $^4$He in aerogels
R.R. dos Santos, N.S. Branco and S.L.A. de Queiroz 583

$^4$He film growth and wetting on curved surfaces
L. Wilen and E. Polturak 585

Reproducible flow rate structure in $^4$He films
R.R. Turkington and R.F. Harris-Lowe 587

$^4$He film flow rates in the oscillatory regime
R.F. Harris-Lowe and R.R. Turkington 589

Thickness scaling of the convective conductance of $^4$He films
D. Finotello, Y.Y. Yu, X.F. Wang and F.M. Gasparini 591

Calculation of Van der Waals effects on correlation-length scaling near $T_\lambda$
X.F. Wang, I. Rhee and F.M. Gasparini 593

Bose–Einstein condensation in quasi-two-dimensional systems
H.B. Ghassib and Y.F. Waqqad 595

*3.4. Physisorbed quantum systems*

$^3$He-layers on graphite
H.J. Lauter, H. Godfrin, V.L.P. Frank and H.P. Schildberg 597

$^3$He film flow: $^4$He substrate coating effect
S.C. Steel, P. Zawadzki, J.P. Harrison and A. Sachrajda 599

Evidence for quantum kinks in the layer-by-layer growth of solid $^4$He on graphite
T.P. Brosius, M.J. McKenna and J.D. Maynard 601

Observation of soliton-like waves in adsorbed films of superfluid $^4$He
M.J. McKenna, R.J. Stanley, E. DiMasi and J.D. Maynard 603

Hybridization of rotational states of adsorbed HD on porous Vycor glass
T.E. Huber and C.A. Huber 605

Wetting of p-$H_2$ on graphite
E. Lerner, A.L. Pereira and F.A.B. Chaves 607

Low temperature NMR study of two-dimensional molecular motion
R.F. Tennis, F. Li and W.P. Kirk 609

Lattice dynamics of commensurate monolayers adsorbed on graphite
H.J. Lauter, V.L.P. Frank, H. Taub and P. Leiderer 611

*3.5. Superfluid $^3$He*

Zero sound experiments on the distorted B phase and in the B–A transition region at low pressures
J.P. Pekola, J.M. Kyynäräinen, A.J. Manninen and K. Torizuka 613

Search for flow induced pressure gradients in superfluid $^3$He-A
P.D. Saundry, L.J. Friedman, C.M. Gould and H.M. Bozler 615

Intrinsic Magnus effect in superfluid $^3$He-A
R.H. Salmelin and M.M. Salomaa 617

Ultrasonic investigations of vortex textures in $^3$He-A
J.M. Kyynäräinen, J.P. Pekola, K. Torizuka and A.J. Manninen 619

Combined ion and NMR measurements on rotating $^3$He-A
K.K. Nummila, P.J. Hakonen and J.S. Korhonen 621

Ultrasonic experiments on rotating superfluid $^3$He-$A_1$
K. Torizuka, J.P. Pekola, J.M. Kyynäräinen, A.J. Manninen and O.V. Lounasmaa 623

The influence of magnetic fields on collective excitations in helium-3-A
P.N. Brusov, M.Y. Nasten'ka, T.V. Filatova-Novosela, M.V. Lomakov and V.N. Popov 625

Symmetry of the $\hat{\boldsymbol{d}}$ vector hedgehogs in superfluid $^3$He-A
M.M. Salomaa 627

Topology of superfluid phase slippage for $^3$He flow in a channel
N.B. Kopnin and M.M. Salomaa 629

Rotating $^3$He-$A_2$ in the vicinity of the transition to the $A_1$ phase
B.N. Kiviladze, G.A. Kharadze and J.M. Kyynäräinen 631

Magnetic field dependence of the superfluid $^3$He A–B transition
Y.H. Tang, I. Hahn, M.R. Thoman, H.M. Bozler and C.M. Gould 633

The collective excitations in planar 2D phase of helium-3
P.N. Brusov and M.V. Lomakov 635

Effects of $^4$He coating on the size effects in superfluid $^3$He as measured by fourth sound
D. Kim, T. Miki, O. Ishikawa, T. Hata, T. Kodama and H. Kojima 637

Viscosity of superfluid $^3$He in high magnetic field
L.P. Roobol, R. Jochemsen, C.M.C.M. van Woerkens, T. Hata, S.A.J. Wiegers and G. Frossati 639

Effects of $^4$He coverage and interface condition on the spin relaxation in $^3$He-$A_1$
Q. Jiang and H. Kojima 641

Thermal expansion coefficient of Fermi liquids at low and elevated temperatures
S. Misawa and H. Morita 643

Slip of normal $^3$He on smooth surfaces
S.M. Tholen and J.M. Parpia 645

Microscopic liquid $^3$He droplets in Ag: heat capacity and TEM
E. Syskakis, Y. Fujii, F. Pobell and H. Schroeder 647

Observation of vortex-like spin supercurrent in $^3$He-B
A.S. Borovik-Romanov, Yu.M. Bunkov, V.V. Dmitriev, Yu.M. Mukharskiĭ and D.A. Sergatskov 649

Anomalous dynamic behaviour of a gas of quasiparticles in superfluid $^3$He-B
S.N. Fisher, A.M. Guénault, C.J. Kennedy and G.R. Pickett 651

On the approach to criticality of a vibrating, macroscopic object in superfluid $^3$He-B
C.J. Lambert 653

Vortices and homogeneously precessing spins in rotating $^3$He-B
V.V. Dmitriev, Y. Kondo, J.S. Korhonen, M. Krusius, Yu.M. Mukharskiĭ, E.B. Sonin and G.E. Volovik 655

Superfluid $^3$He-B in a realistic thin film: gap function
L.J. Buchholtz 657

Superfluid $^3$He-B at a rough surface: density of states
L.J. Buchholtz 659

Observation of new structures in the collective mode spectrum of $^3$He-B
Z. Zhao, S. Adenwalla, M.C. Shih, J.B. Ketterson and B.K. Sarma 661

Modes of superfluid $^3$He in the entire hydrodynamic region
M. Grabinski and M. Liu 663

Symmetry of $\boldsymbol{n}$ soliton in superfluid $^3$He-B in slab geometry
T. Takagi and M. Tsubota 665

Investigation of the RSQ mode of helium-3-B using non-resonant transducers
P.N. Fraenkel, R. Keolian and J.D. Reppy 667

Ultrasonic investigation of rotating $^3$He-B in strong magnetic fields
A.J. Manninen, J.M. Kyynäräinen, K. Torizuka and J.P. Pekola 669

Homogeneously precessing spin domain in rotating vortex-free $^3$He-B
J.S. Korhonen, V.V. Dmitriev, Z. Janu, Y. Kondo, M. Krusius and Yu.M. Mukharskiĭ 671

NMR absorption in a homogeneously precessing domain of $^3$He-B
Y. Kondo, J.S. Korhonen and M. Krusius 673

Instability of the homogeneous precession in $^3$He-B (catastrophic relaxation)
Yu.M. Bunkov, V.V. Dmitriev, J. Nyéki, Yu.M. Mukharskiĭ, D.A. Sergatskov and I.A. Fomin 675

Ultrasonic spectroscopy of the gap mode resonance in superfluid $^3$He-B
E.R. Dobbs, R. Ling and J. Saunders 677

The influence of Van der Waals forces on $T_c$ in thin films of $^3$He
G. Haran, L. Borkowski and L. Jacak 679

Magnetic relaxation in superfluid $^3$He-B
A.S. Borovik-Romanov, Yu.M. Bunkov, A. de Waard, V.V. Dmitriev, A.V. Markelov, Yu.M. Mukharskiĭ and D. Einzel 681

The force on a wire moving through superfluid $^3$He-B
R.J. Watts-Tobin and S.N. Fisher 683

The influence of textures on collective modes in superfluid helium-3
P.N. Brusov and M.M. Bukshpun 685

The influence of electric fields on collective excitations in helium-3-B
P.N. Brusov and M.V. Lomakov 687

*3.6. $^3$He on surfaces*

NMR measurements of $^3$He in thin $^3$He–$^4$He mixture films
R.H. Higley, D.T. Sprague and R.B. Hallock 689

Fermi liquid parameters of a 2D $^3$He film
C.P. Lusher, J. Saunders and B.P. Cowan 691

Nuclear magnetic susceptibility of submonolayer $^3$He films adsorbed on graphite
J. Saunders, C.P. Lusher and B.P. Cowan 693

Changes in the field dependence of the $^3$He relaxation process with $^3$He coverage
T.J. Gramila, F.W. van Keuls and R.C. Richardson 695

Two-dimensional solid $^3$He: a frustrated magnetic system?
M. Roger 697

Spin heat capacity of the second solid layer of $^3$He adsorbed on graphite
D.S. Greywall 699

$^3$He films and the RKKY interaction
R.A. Guyer 701

Anisotropic magnetic order in adsorbed $^3$He films
S. Tasaki 703

Very low field susceptibility of the boundary layers of $^3$He on grafoil
L.J. Friedman, A.L. Thomson, C.M. Gould, H.M. Bozler, P.B. Weichman and M.C. Cross 705

Spin diffusion and exchange in 2D solid helium-3 films
B. Cowan, M. Fardis, T. Crane and L. Abou-el-Nasr 707

Static magnetization of multilayers of $^3$He adsorbed on sintered silver
A. Fukushima, Y. Okuda and S. Ogawa 709

Magnetic structure of vortex lattice state in the adsorbed second layer of $^3$He films
M. Fujita and K. Machida 711

Measurements of the exchange interaction in 2D solid $^3$He films adsorbed on graphite
J. Saunders, C.P. Lusher and B.P. Cowan 713

Observation of quantum size effects in thin films of liquid $^3$He adsorbed on graphite
C.P. Lusher, J. Saunders and B.P. Cowan 715

Enhanced magnetic relaxation of $^3$He at substrate quadrupole frequency
F.W. van Keuls, T.J. Gramila, L.J. Friedman and R.C. Richardson 717

Fermion oceans
R.A. Guyer, K.R. McCall and D.T. Sprague 719

*3.7. Spin-polarised systems*

Measurement of longitudinal spin diffusion in dilute $^3$He–$^4$He solutions
G. Nunes Jr., C. Jin, A.M. Putnam and D.M. Lee 721

Non-linear effect on spin waves in $^3$He–$^4$He dilute solution
H. Akimoto, O. Ishikawa, G.-H. Oh, M. Nakagawa, T. Hata and T. Kodama 723

NMR relaxation times for a dilute polarized Fermi gas
W.J. Mullin, F. Laloë and M.G. Richards 725

Multiple spin echoes in Fermi liquids
A.S. Bedford, R.M. Bowley, D. Wightman and J.R. Owers-Bradley 727

High field NMR experiments on a $^3$He–$^4$He solution
J.R. Owers-Bradley, D. Wightman, R.M. Bowley and A.S. Bedford 729

Measurement of spin transport in very dilute, polarized $^3$He–$^4$He mixtures
D. Candela, D.R. McAllaster and L.-J. Wei 731

Enhancement of the superfluid transition temperature in liquid $^3$He due to transient polarization
S.A.J. Wiegers, T. Hata, P.G. van de Haar, L.P. Roobol, C.M.C.M. van Woerkens, R. Jochemsen and G. Frossati 733

Heat conduction in spin polarized gaseous helium-3: recent theoretical and experimental results
B. Brami, F. Joly, C. Lhuillier, C. Larat, M. Leduc, P.-J. Nacher, G. Tastevin and G. Vermeulen 735

Viscosity change for liquid $^3$He in a 10 tesla field
G.A. Vermeulen, A. Schuhl, F.B. Rasmussen, J. Joffrin and M. Chapellier 737

Spin wave spectroscopy of spin polarized atomic hydrogen: measurement of the longitudinal spin diffusion coefficient
N.P. Bigelow, J.H. Freed and D.M. Lee 739

Atomic deuterium at 1 K
M.W. Reynolds, M.E. Hayden and W.N. Hardy 741

Proton polarization of atomic hydrogen at 0.5 K by ESR pumping
A.Ya. Katunin, S.A. Vasilyev, I.I. Lukashevich, A.I. Safonov, E. Tjukanov and S. Jaakkola 743

The recombination of atomic hydrogen below 1 K
S. Buchman, Y. Xiao, L. Pollak, D. Kleppner and T.J. Greytak 745

Boundary conditions and spin waves in spin-polarized quantum gases
A.E. Meyerovich 747

*3.8. Flow and vortices*

Critical flow of superfluid helium-4 through a submicron aperture: width of the critical transition
W. Zimmermann Jr., O. Avenel and E. Varoquaux 749

Critical flow of superfluid helium-4 through a submicron aperture: dependence on pressure
O. Avenel, E. Varoquaux and W. Zimmermann Jr. 751

Phase-slips in the flow of superfluid $^4$He through a submicron orifice
A. Amar, J.C. Davis, R.E. Packard and R.L. Lozes 753

Quasiclassical theory of the Josephson effect in superfluid $^3$He
E.V. Thuneberg, J. Kurkijärvi and J.A. Sauls 755

Pressure dependence of vortex tunneling in He II
P.C. Hendry, N.S. Lawson, P.V.E. McClintock, C.D.H. Williams and R.M. Bowley 757

Flow state of $^3$He in adiabatic flow of He II
T. Satoh and M. Okuyama 759

Evidence for a low dimension strange attractor for temperature variations inside helium-II counterflow jets
P.J. Dolan Jr. and C.W. Smith 761

Josephson oscillation in superfluid helium
T. Kebukawa and S. Sasaki 763

Progress towards a superfluid $^4$He analog of the superconducting RF SQUID
M. Bonaldi, M. Cerdonio and S. Vitale 765

$^3$He-induced free vortices in thin superfluid films
D. Finotello, Y.Y. Yu and F.M. Gasparini 767

Vortices and finite-size scaling of superfluid phase transitions
G.A. Williams 769

Superfluid frictional force in adiabatic flow of He II
T. Satoh and M. Okuyama 771

Kinetic theory of mutual friction force in superfluid $^4$He with vortex lines
K. Yamada, K. Miyake and S. Kashiwamura 773

Superfluid turbulence in non-uniform thermal counterflow
J.F. Kafkalidis and J.T. Tough 775

Experimental examination of the appearance of vortices in He II Taylor Couette flow
C.J. Swanson, C.E. Swanson and R.J. Donnelly 777

*3.9. Nuclear magnetism*

Nuclear order in copper: new type of antiferromagnetism in an ideal fcc system
A.J. Annila, K.N. Clausen, P.-A. Lindgård, O.V. Lounasmaa, A.S. Oja, K. Siemensmeyer, M. Steiner, J.T. Tuoriniemi and H. Weinfurter 779

Nuclear antiferromagnetic phases of copper in a field
A.J. Annila, K.N. Clausen, P.-A. Lindgård, O.V. Lounasmaa, A.S. Oja, K. Siemensmeyer, J.T. Tuoriniemi and H. Weinfurter 781

Kinetics, hysteresis and nonadiabaticity of the phase transitions in the nuclear spin system of copper
A.J. Annila, K.N. Clausen, A.S. Oja, K. Siemensmeyer, M. Steiner, J.T. Tuoriniemi and H. Weinfurter 783

Studies of nuclear magnetism in silver at positive and negative nanokelvin temperatures
P. Hakonen and S. Yin 785

Antiferromagnetic resonance of hyperfine enhanced nuclear spins of Ho in $HoVO_4$
H. Suzuki and M. Ono 787

Anomalously weak nuclear spin–lattice coupling of Cu below 1 mK
K. Gloos, P. Smeibidl and F. Pobell 789

Anomalous nuclear magnetic resonance behaviour of $^{115}In$ in $AuIn_2$
K. Gloos, R. König, P. Smeibidl and F. Pobell 791

NQR studies of scandium metal at low temperatures
L. Pollack, E.N. Smith, R.E. Mihailovich, J.H. Ross Jr., P. Hakonen, E. Varoquaux, J.M. Parpia and R.C. Richardson 793

Experiment on nuclear spin ordering in Sc metal
H. Suzuki, T. Sakon and N. Mizutani 795

Competition of antiferromagnetic "up-down" and "up-up-down" order in the nuclear spin system of copper
H. Viertiö and A. Oja 797

Nuclear antiferromagnetism in copper: predictions for spin structures in a magnetic field
H. Viertiö and A. Oja 799

*3.10. Quantum solids*

Spin relaxation of nuclear ordered bcc solid $^3He$ in the low field phase
Y. Sasaki, Y. Hara, T. Mizusaki and A. Hirai 801

NMR studies of vacancies in solid hydrogen
D. Zhou, M. Rall, J.P. Brison and N.S. Sullivan 803

Experimental measurements of $^4He$ solid–liquid interface inertia
J. Poitrenaud and P. Legros 805

Orientation dependence of the Kapitza resistance between liquid and hcp $^4He$
M.S. Pettersen and D.O. Edwards 807

Low-temperature clustering of o-$H_2$ impurities in p-$H_2$ crystals
A.E. Meyerovich 809

Pinning and unpinning of charged grain boundaries in bcc $^4He$ with 5% $^3He$
A.I. Golov and L.P. Mezhov-Deglin 811

Motion of injected charges in solid $^4He$ containing up to 5% $^3He$
A.I. Golov and L.P. Mezhov-Deglin 813

Fluctuation effects in phase segregation
P. Kumar and M. Bernier 815

Heat capacity and pressure at phase separation and solidification of $^3$He in hcp $^4$He
R. Schrenk, O. Friz, Y. Fujii, E. Syskakis and F. Pobell 817

Kinetics of the phase separation of the dilute $^3$He–$^4$He hcp solutions and magnetic properties of $^3$He dispersed in solid $^4$He matrix
A.A. Golub, V.A. Goncharov, V.A. Mikheev, V.P. Rusnak and V.A. Shvarts 819

Universal behaviour of spin–lattice relaxation in solid helium-3
B. Cowan and M. Fardis 821

Measurement of spin diffusion in solid helium-3
B. Cowan and M. Fardis 823

Melting pressure of solid $^3$He near the magnetic tricritical point
T. Okamoto, H. Fukuyama, T. Fukuda, H. Ishimoto and S. Ogawa 825

Melting pressure of solid $^3$He in magnetic field near the nuclear ordering temperature
A. Sawada, A. Shinozaki, W. Itoh, K. Torizuka, M. Suga, T. Satoh and T. Komatsubara 827

Monte Carlo study of the multiple exchange model in solid $^3$He
K. Matsumoto 829

Magnetic properties of the high field phase in bcc solid $^3$He
K. Iwahashi and Y. Masuda 831

Magnetization of bcc solid $^3$He in a high magnetic field
T. Fukuda, H. Fukuyama, T. Okamoto, H. Ishimoto and S. Ogawa 833

Exchange contribution to the pressure in hcp solid $^3$He
Y. Miura, S. Abe, N. Matsushima, S. Sugiyama and T. Mamiya 835

Nuclear magnetism of hcp solid $^3$He above the ordering temperature
T. Mamiya, H. Yano, H. Kondo, T. Suzuki, T. Kato, Y. Minamide, Y. Miura and S. Inoue 837

**PART II: CONTRIBUTED PAPERS**

**4. Low temperature properties of solids**

*4.1. 2-D electron systems and semiconductors*

A model weakly-pinned charge-density wave: electrons on a helium film
H.W. Jiang and A.J. Dahm 839

Surface state electrons on solid hydrogen films
U. Albrecht, H. Dilger, P. Leiderer and K. Kono 841

The magnetoresistance of 2-D electrons on liquid helium in the extreme quantum limit
P. Fozooni, M.J. Lea, A.O. Stone and J. Frost 843

High-field magnetoconductance of electrons on liquid helium
J. Neuenschwander, P. Scheuzger, W. Joss and P. Wyder 845

Transport in an electron interferometer and an artificial one-dimensional crystal
B.J. van Wees, L.P. Kouwenhoven, J.R. Kraayeveld, F.W.J. Hekking, C.P.M. Harmans and J.G. Williamson 847

Quantum adiabatic transport through an array of constrictions
M. van Eijck, F.W.J. Hekking, L.P. Kouwenhoven and G. Schön 849

Free-carrier absorption in n-type InSb at low temperatures and quantizing magnetic fields
C.C. Wu 851

Tunnel measurement of density of states of ultrathin arsenic-doped layers in silicon
M.W. Denhoff 853

Problem of localization and scattering of the conduction electrons at the rough metal surface
A.A. Krokhin, N.M. Makarov, V.A. Yampol'skii and I.V. Yurkevich 855

Quantum interference at mesoscopic length scales
V. Srivastava 857

Spin–orbit effects in a 2-dimensional electron gas system sith 2 subbands occupied
R. Taboryski and P.E. Lindelof 859

The effect of spin–orbit scattering and of impurity configuration on universal conductance fluctuations
S.J. Klepper, O. Millo, M.W. Keller, S. Xiong, D.E. Prober and R.N. Sacks 861

Low-temperature transport in epitaxial $CoSi_2$ films
J.F. Ditusa, J.M. Parpia and J.M. Phillips 863

Mesoscopic charge mapping by conductance fluctuations
M. Davison, R.P. Taylor, P.C. Main, P.H. Beton, S.P. Beaumont and C.D.W. Wilkinson 865

Temperature and angular dependence of magnetoresistance oscillations in a 2DEG subjected to a periodic potential
M. Davison, R.P. Taylor, E.S. Alves, P.H. Beton, M. Dellow, P.C. Main, L. Eaves, M. Henini, O.H. Hughes, S.P. Beaumont and C.D.W. Wilkinson 867

Screening and bound states in a semiconductor superlattice
H.K. Sy and W.C. Shia 869

Transport measurements on a high mobility, ultralow carrier concentration inverted GaAs/AlGaAs heterostructure
P.M. Echternach, K. Hu, A. Madhukar and H.M. Bozler 871

Acoustic phonon scattering by a 2-dimensional electron gas
P.J.A. Carter, V.W. Rampton, M.I. Newton, K. McEnamey, M. Henini and O.H. Hughes 873

Two-dimensional De Haas–Van Alphen effect: sharp Landau levels
V.I. Marchenko, K. Jauregui, W. Joss and I.D. Vagner 875

A two-dimensional electron gas as a thermocouple phonon detector
F. Dietzel, W. Dietsche and K. Ploog 877

The melting of a 2-D electron solid on helium in a magnetic field
A.O. Stone, P. Fozooni, M.J. Lea and J. Frost 879

AC skin depths in a screened 2-D electron gas in a magnetic field
M.J. Lea, J. Frost, A.O. Stone and P. Fozooni 881

*4.2. Organic and low dimensional conductors*

Upper critical field of quasi one-dimensional d-wave superconductors
M. Prohammer and J.P. Carbotte 883

Possible temperature dependence of the orbital susceptibility of $C_{24}SbCl_5$ at low temperatures
S. Ikehata 885

The Meissner effect in $TaSe_3$
S. Nagata, S. Ebisu, T. Aochi, Y. Kinoshita and S. Chikazawa 887

The low temperature specific heat of $\kappa$-(BEDT-TTF)$_2$Cu(NCS)$_2$
R.G. Goodrich and J.-c. Xu 889

Magnetization anomalies in one-dimensional halogen-bridged platinum complex: field-induced diamagnetic transition and antiferromagnetism
M. Haruki and P. Wachter 891

*4.3. Disordered systems*

Low-energy excitations in CDW compounds investigated by low-temperature specific heat
J.C. Lasjaunias, K. Biljaković and P. Monceau 893

Acoustic properties of metallic glasses at low temperatures
R. Görlich, J. Stockburger and U. Weiss 895

Strong phonon coupling and the relaxation rate spectrum in glasses
K. Kassner 897

Study of the tunneling states in neutron-irradiated quartz: a quantitative analysis of ultrasonic attenuation measurements after heat treatment
V. Keppens, A. Vanelstraete and C. Laermans 899

Ultrasonic measurements of the variation of the velocity of sound in electron-irradiated quartz: a quantitative analysis to the tunneling model
A. Vanelstraete, C. Laermans and V. Keppens 901

Influence of oxidation and of $H_2$-exchange gas on the thermal properties of silica aerogels
A. Bernasconi, T. Sleator, D. Posselt and H.R. Ott 903

Tunneling states in pure silver
P. Thauer, P. Esquinazi and F. Pobell 905

Specific heat of silica aerogels at very low temperatures
T. Sleator, A. Bernasconi, E. Felder, D. Posselt and H.R. Ott 907

*4.4. Low temperature properties of solids*

The low temperature thermal conductivity of a chain-extended polymer
S.E. Regan and D. Greig 909

Thermal point-contact spectroscopy of NaCl
P. Stefányi and A. Feher 911

Interaction of charges with orthomolecules in solid hydrogen
A.A. Levchenko and L.P. Mezhov-Deglin 913

An evidence of the structural transformation at 150 mK in Ho-elpasolite observed by SR X-ray topography
T. Nakajima, H. Suzuki and K. Tsutsumi 915

Point-contact spectroscopy in arsenic: classical and quantum-mechanical trajectory effects
N.N. Gribov, P. Samuely, J.A. Kokkedee, A.G.M. Jansen, I.K. Yanson and P. Wyder 917

Direct CW–NMR observation of forbidden transitions at double Larmor frequency in hydrogen
L. Skrbek, J. Sebek and R.S. Safrata 919

Hyperfine interactions of implanted nuclei in graphite observed by low temperature nuclear orientation
B. Kastelein, H. Postma, L. Klostermann, J.K.W.M. Vemer and H.C. Meijer 921

Eigenvalues and eigenvectors in CuCl at 4.2 K
C. Patel and W.F. Sherman 923

**5. Superconductivity**

*5.1. Macroscopic quantum tunnelling and Coulomb blockade*

Superconducting measurement circuit for an EPR experiment with an RF SQUID
C.D. Tesche 925

Single-electron charging of the quantum wells and dots
A.N. Korotkov, D.V. Averin and K.K. Likharev 927

Single electron tunneling oscillations in one-dimensional arrays of ultrasmall tunnel junctions
P. Delsing, K.K. Likharev, L.S. Kuzmin and T. Claeson 929

Macroscopic resonant tunneling and anomalous current–voltage characteristics
N. Hatakenaka, H. Takayanagi and S. Kurihara 931

Two ways toward experimental observation of the Bloch oscillations in ultrasmall Josephson junctions
A.B. Zorin, L.S. Kuzmin and K.K. Likharev 933

Phase locking of the Bloch oscillations in ultrasmall Josephson junctions
D.V. Averin and A.A. Odintsov 935

Charge and flux fluctuation and new macroscopic quantum effect in weakly linked superconductor junctions
M. Sugahara, N. Yoshikawa and S. Furuoya 937

Balance between Zener tunneling and Bragg reflections in a small Josephson junction
A. Maassen van den Brink, U. Geigenmüller and A.D. Zaikin 939

Band structure of coupled Josephson junctions in the presence of a vortex
U. Geigenmüller and G. Schön 941

Zener transitions for a spiky drive
E. Shimsoni, D.V. Averin and G. Schön 943

Incoherent tunneling of the Cooper pairs and magnetic flux quanta in ultrasmall Josephson junctions
D.V. Averin, Yu.V. Nazarov and A.A. Odintsov 945

Sweep rate effects and quantum energy levels in Josephson junctions
P. Silvestrini, L. Frunzio and R. Cristiano 947

Resonant tunneling of Cooper pairs in a double Josephson junction system
V.Ya. Aleshkin and D.V. Averin 949

Observation of final state effects on macroscopic quantum transitions
J. Lapointe, S. Han and J. Lukens 951

Level crossing in a dissipative environment
P. Ao and J. Rammer 953

Phase transitions in Josephson junctions with dissipation due to a current flow through a narrow constriction
G. Schön and A.D. Zaikin 955

Anomalous crossover behaviour for dissipative tunnelling
W. Hontscha, P. Hänggi and E. Pollak 957

Photon-assisted macroscopic quantum tunneling in a small Josephson junction
H. Takayanagi 959

Quantized electrostatic field effects in the disordered two-dimensional systems of superconducting small particles
N. Yoshikawa, T. Murakami and M. Sugahara 961

Single-electron solitons in 2-D arrays of ultrasmall tunnel junctions
N.S. Bakhvalov, G.S. Kazacha, K.K. Likharev and S.I. Serdyukova 963

Pair interference and the phase diagram of granular superconductors
G. Falci, R. Fazio, V. Scalia and G. Giaquinta 965

A unified theory of clean Josephson junctions
A. Furusaki and M. Tsukada 967

Ballistic vortex motion in 2-D underdamped Josephson junction arrays
H.S.J. van der Zant, F.C. Fritschy, T.P. Orlando and J.E. Mooij 969

Coulomb blockade of Cooper pair tunneling
L.J. Geerligs, V.F. Anderegg and J.E. Mooij 971

Tunneling time and offset charging in small tunnel junctions
L.J. Geerligs, V.F. Anderegg and J.E. Mooij 973

Effects of quasi-particle dissipation in small metallic junctions
V. Scalia, G. Falci, R. Fazio and G. Giaquinta 975

Observability of the Coulomb blockade in single tunnel junctions
M.H. Devoret, D. Esteve, H. Grabert, G.-L. Ingold, H. Pothier and C. Urbina 977

Quantum fluctuations and Coulomb blockade in small tunnel junctions
A.N. Cleland, J.M. Schmidt and J. Clarke 979

Standard quantum limit and squeezing of mesoscopic tunneling current
M. Ueda 981

*5.2. HTS: microscopic theory – strong correlations*

$T_c$ versus $\Delta V_A$ correlation in Cu-oxide superconductors
Y. Ohta, T. Tohyama and S. Maekawa 983

An exact mapping of the *t–J* model to the unrestricted Hilbert space
C. Gros and M.D. Johnson 985

The *t–J* model: anyons, flux states, spinons, holons, and all that
S.E. Barnes 987

Long-wavelength effective action for the spin-fermion system
A. Muramatsu and R. Zeyher 989

Exact solution of the one-dimensional supersymmetric *t–J* model
S. Sarkar 991

Spin-waves in hole-doped antiferromagnets
D.Y.K. Ko 993

Mass reduction as a basic pairing mechanism in high temperature superconductivity
T. Izuyama 995

Neutron scattering and the *t–J* model with bosonic spins
P. Hedegård and M.B. Pedersen 997

A mean field *t–J* model for high-$T_c$ superconductivity containing two kinds of point defects
J.W. Halley, S. Davis and S. Sen 999

Are high-$T_c$ superconductors Luttinger or Fermi liquids?
P. Entel and J. Zielinski 1001

Fermi liquid picture for cuprous oxides
S. Kurihara 1003

Effective Hamiltonian and electronic states in oxide superconductors
S. Ishihara, H. Matsumoto and M. Tachiki 1005

On superconducting pairing in the two-band Hubbard model
S.V. Lovtsov, N.M. Plakida and V.Yu. Yushankhai 1007

Superconducting transition of 2D two-band systems with interband pair-transfer interaction
K. Yamaji 1009

Two-band Hubbard model for copper oxide superconductors
K. Kuroki and H. Aoki 1011

Derivation of the *t–J* model for high temperature superconductivity
J.H. Jefferson 1013

Charge-transfer gap from a Monte Carlo simulation of the three-band Hubbard model
G. Dopf, T. Kraft, A. Muramatsu and W. Hanke 1015

Quantum Monte Carlo and quantum chemical study of the ground state of the high-$T_c$ copper oxides
Y. Asai 1017

Cluster model calculation of physical parameters in copper oxide superconductors
T. Tohyama and S. Maekawa 1019

Variational Monte Carlo study for generalized flux phases in the $t$–$J$ model
M. Ogata and T.M. Rice 1021

New narrow band in the p–d mixing model of oxide superconductors
H. Matsumoto, M. Sasaki and M. Tachiki 1023

Hole motion in one-dimensional $t$–$J$–$J'$ model
I. Doi, K. Sano and K. Takano 1025

Hole and its surrounding spins in a quantum spin-liquid state
A. Oguri, K. Yamanaka, J. Inoue and S. Maekawa 1027

Spin structure around mobile holes in an antiferromagnet
J. Inoue and S. Maekawa 1029

On properties of localized excitations in weakly doped high-$T_c$ superconductors
V.L. Pokrovsky and G.V. Uimin 1031

Superconductivity due to Coulomb interactions
S. Küchenhoff and S. Schiller 1033

Effect of charge density wave on superconducting critical temperature
M. Ichimura, M. Fujita and K. Nakao 1035

Superconductivity and charge density wave in a 2-D electron system
B.R. Bulka 1037

Effect of repulsion among fermion pairs on the problem of crossover between Cooper-pair and Bose–Einstein condensation
A. Tokumitu, K. Miyake and K. Yamada 1039

Bipolaron theory of metalo-oxide superconductors in the strong magnetic field
A.S. Alexandrov and D.A. Samartchenko 1041

Non-linearities in bipolaronic superconductivity
R. Sridhar 1043

Superconducting glass behaviour in the random interaction Hubbard model
T.K. Kopeć and P. Wróbel 1045

Properties of a negative-$U$ superconductor with magnetic impurities
N. Mori 1047

On the role of Cu–O chains in $YBa_2Cu_3O_{7-x}$ system from the plasmon-mediated mechanism
T.J. Watson Yang, S.-F. Tsay and S.-Y. Wang 1049

Model of consecutive superconducting transitions
D.S. Hirashima and T. Matsuura 1051

*5.3. HTS: microscopic theory – weak correlations*

Van Hove excitations and high-$T_c$ superconductivity
R.S. Markiewicz 1053

Quasiparticle scattering across the Fermi surface in $La_{2-x}M_xCuO_4$
W.E. Pickett, H. Krakauer and R.E. Cohen 1055

Theoretical determination of strong electron–phonon coupling in $YbA_2Cu_3O_7$
R.E. Cohen, W.E. Pickett, H. Lu and H. Krakauer 1057

Anisotropic gap and quasiparticle damping effects on $T_1^{-1}$ of $YBa_2Cu_3O_7$
B.W. Statt 1059

$B_{c2}(T)$ of anisotropic systems: some explicit results
E. Langmann 1061

Time dependent Bogoliubov–De Gennes equations for superconductors with anisotropic pairing interaction
O. Wacker and R. Kümmel 1063

Quasiparticles in a periodic pair potential: a density of states model for $YBa_2Cu_3O_7$
A. Hahn 1065

Superconducting properties in layered oxide superconductors
S. Takahashi and M. Tachiki 1067

Isotope effect with a large Coulomb pseudopotential in an electron–phonon superconductor
R. Akis and J.P. Carbotte 1069

Critical currents in type I, thin film superconductors
E.J. Nicol and J.P. Carbotte 1071

Strong-coupling theory for extended s-wave and d-wave pairing in high-$T_c$ superconductors
S. Lenck, S. Wermbter and L. Tewordt 1073

Effect of magnetic impurities on the BCS and Josephson interlayer pair transfer in high-$T_c$ superconductors
D. Fay and J. Appel 1075

Theory of NMR and specific heat for extended s-wave and d-wave pairing states in high-$T_c$ superconductors
C.T. Rieck, D. Fay and L. Tewordt 1077

On nonlinear electron–lattice interaction and anharmonicity in HTSC
J. Schreiber and P. Härtwich 1079

The gap parameter near a surface in small $\xi_0$ superconductors
O.T. Valls, M.T. Béal-Monod, T. Giamarchi and S.W. Pierson 1081

Phonon squeezed state in high-$T_c$ superconductors
T. Sota and K. Suzuki 1083

Lattice dynamics of $La_2CuO_4$ and $YBa_2Cu_3O_7$
S. Kimura, T. Sota and K. Suzuki 1085

Theoretical consequences of the correlation of the Cooper pairs in the narrow band electron systems
S.-i. Koh 1087

On the theory of La–Sr–Cu–O superconductors
L.-y. Zhang and X.-f. Zhang 1089

*5.4. Superconductivity theory: phenomenology*

Is a BCS-like theory sufficient to describe the superconducting state of Y–Ba–Cu–O?
W. Pint and E. Schachinger 1091

Ginzburg–Landau equations for a superconductor with broken $P$ and $T$ symmetries
A.G. Aronov and A.L. Shelankov 1093

Ginzburg–Landau free energy in unconventional superconductors
M. Palumbo, C.H. Choi and P. Muzikar 1095

Fluctuations in the Abrikosov flux lattice in high-temperature superconductors
S. Koka and K.N. Shrivastava 1097

Statistical mechanics of flux configurations in oxide superconductors
T. Izuyama and S. Ishizaka 1099

Peculiar magnetic properties of anisotropic London superconductors
A.I. Buzdin and A.Yu. Simonov 1101

Magnetic field inversion and vortex chains in anisotropic superconductors
A.M. Grishin, A.Yu. Martynovich and S.V. Yampolskii 1103

Anomalous enhancement of $H_{c1}$ in layered copper oxide superconductors
T. Koyama, N. Takezawa and M. Tachiki 1105

Localisation of excitations by particle–hole scattering in inhomogeneous superconductors
C.J. Lambert and V.C. Hui 1107

Two-dimensional phenomena in high temperature superconductors
B. Horovitz 1109

Effects of boundaries in an array of superconducting weak links
G.O. Zimmermann, C.J. Lobb and M.S. Rzchowski 1111

New critical current–flux boundary of a superconducting microladder
H.J. Fink and S.B. Haley 1113

The "irreversibility line" viewed as a phase transition: thermodynamic properties
R. Tournier, B. Giordanengo, P. de Rango and A. Sulpice 1115

Disorder induced phase transition in the Abrikosov phase of superconductors
K. Ziegler 1117

Proximity effects and critical fields in high-$T_c$ superconductors
M. Ledvij, D. Davidović and L. Dobrosavljević-Grujić 1119

Effect of pinning on flux-lattice melting in an anisotropic superconductor
R.S. Markiewicz 1121

Pinning of two-dimensional vortex lattice: influence of thermal fluctuations
A.E. Koshelev 1123

*5.5. HTS: vortex lattice melting, flux pinning and flux creep*

Fluctuation of the specific heat for the superconductors near $H_{c2}$
A. Fujita, S. Hikami and E. Brézin 1125

The charge unbinding transition in arrays of tunnel junctions
R. Fazio and G. Schön 1127

Does the flux-line lattice melt?
E.H. Brandt 1129

Non-logarithmic magnetic relaxation in $PbMo_6S_8$
P. Norling, K. Niskanen, P. Nordblad, P. Svedlindh, L. Lundgren, C. Rossel, M. Sergent, R. Chevrel and M. Potel 1131

Correlation between magnetic relaxation and $J_c$ of $YBa_2Cu_3O_7$ films
N. Kobayashi, K. Miyoshi, H. Kawabe, K. Watanabe, H. Yamane, H. Kurosawa, T. Hirai and Y. Muto 1133

Intergrain flux distribution, creep and pinning in $Y_1Ba_2Cu_3O_7$/Ag superconductor
J. Jung, M.A.-K. Mohamed and J.P. Franck 1135

Magnetization curve and its relaxation of Bi–Sr–Ca–Cu–O films
T. Nojima and T. Fujita 1137

Dislocation mediated flux motion in $Bi_2Sr_2CaCu_2O_{8+\delta}$
C.J. van der Beek, V.M. Vinokur and P.H. Kes 1139

The irreversibility line of $Bi_{2-x}Pb_xSr_2Ca_2Cu_3O_{10}$: the breakdown of an intrinsic proximity effect
P. de Rango, B. Giordanengo, J.L. Genicon, P. Lejay, A. Sulpice and R. Tournier 1141

Magnetic irreversibility and flux pinning in single crystalline $Bi_2Sr_2Ca_1Cu_2O_{8+y}$
C. Quitmann, U. Ebels, P.C. Splittgerber-Hünnekes and G. Güntherodt 1143

Irreversibility temperature and Meissner fraction in high temperature superconductors
S.B. Ota, G.P. Rapson and P.A.J. de Groot 1145

The "irreversibility line" of a $Tl_2Ba_2CaCu_2O_8$ single crystal: evidence for a phase transition
B. Giordanengo, J.L. Genicon, A. Sulpice, J. Chaussy, R. Tournier, J.C. Frison, J.P. Chaminade, M. Pouchard and J. Etourneau 1147

Magnetic flux pinning and irreversibility in $YBa_2Cu_3O_7$ superconducting crystal
L.T. Sagdahl, S. Gjølmesli, P. Tuset, O.-M. Nes, T. Lægreid, K. Fossheim and W. Assmus 1149

The depinning line of a $Y(Gd)Ba_2Cu_3O_x$ single crystal
P. Esquinazi, A. Gupta and H.F. Braun 1151

Magnetic phase diagram of 32 K superconductor $(Bi_{1.6}Pb_{0.4})(Sr_{1.5}La_{0.5})CuO_{6+\delta}$
H.C. Ku, J.B. Shi, C.C. Lai and S.J. Sun 1153

Vortex lattice melting of the electron superconductor $Nd_{1.85}Ce_{0.15}CuO_{4-\delta}$
G.H. Hwang, T.H. Her, C.Y. Lin and H.C. Ku 1155

Influence of the phase separation on the Meissner effect of $La_2CuO_4$
A. Sulpice, P. Lejay, R. Tournier, B. Chevalier, G. Demazeau and J. Etourneau 1157

Magnetoresistivity in superconducting state of single crystalline $Bi_2Sr_2CaCu_2O_{8+\delta}$
K. Kadowaki, A.A. Menovsky and J.J.M. Franse 1159

Flux creep in $YBa_2Cu_3O_{7-y}$ epitaxial film
J. Sha, J.Z. Shi, Z.H. He, W.Z. Shi, X.H. Chen, N.L. Wang, X.A. Cheng, Z.P. Su, L.Z. Cao, Zh. Qi and Q.R. Zhang 1161

Vortex dynamics in $YBa_2Cu_3O_7$ films
P. Martinoli, Ph. Flückiger, V. Marsico, P.K. Srivastava, Ch. Leemann and J.L. Gavilano 1163

Flicker-noise in superconducting glass-ceramics $BaPb_{0.75}Bi_{0.25}O_3$
A.M. Gabovich, D.P. Moiseev, V.M. Postnikov, V.A. Kulikov and L.V. Matveets 1165

Flux pinning and peak effects in single crystalline 2H-$NbSe_2$
P. Koorevaar, J. Aarts, P. Berghuis and P.H. Kes 1167

Flux-creep and viscous flux-line motion in thin films of A-$Nb_3Ge$
P. Berghuis and P.H. Kes 1169

Influence of plastic deformation of the flux line lattice on the 2D pinning
V.G. Prokhorov, G.G. Kaminsky, C.G. Tretiatchenko and V.M. Pan 1171

Effect of vortex bending and pinning on surface impedance of superconductors in the mixed state
E.B. Sonin, A.K. Tagantsev and K.B. Traito 1173

Flux creep in layered high-$T_c$ superconductors
B.I. Ivlev and N.B. Kopnin 1175

Numerical simulation of flux creep through arrays of Josephson junctions
A.I.M. Rae 1177

*5.6. HTS: magnetic ordering*

Direct observation of collective pinning in a deformed type-II superconductor Nb–Mo
I.V. Grigoryeva 1179

The London moment for high temperature superconductors
A.A. Verheijen, J.M. van Ruitenbeek, R. de Bruyn Ouboter and L.J. de Jongh 1181

Superconductivity and normal-state magnetism in $La_{2-x}Sr_xCuO_4$
R. Yoshizaki, N. Ishikawa, N. Kuroda, E. Kita, A. Tasaki and H. Ikeda 1183

Transport and magnetic properties of $La_xSr_{1-x}TiO_3$
Y. Maeno, S. Awaji, H. Matsumoto and T. Fujita 1185

Magnetic order in the $(La, Pr, Sr)_2CuO_4$ system across the T′ →O phase transition
M.J. Rosseinsky and K. Prassides 1187

On the magnetoconductance at the spin structure change in La–Ba–Cu–O system
M. Sato, M. Sera, S. Yamagata, S. Shamoto and K. Oka 1189

Interaction between superconductivity and magnetic moments in $RBa_2(Cu_{1-x}Zn_x)_3O_{7-\delta}$ (R=Gd, Dy and Y)
M. Furuyama, I. Iguchi, N. Kobayashi and Y. Muto 1191

Superconducting and magnetic properties of $Gd_{1-x}Pr_xBa_2Cu_3O_{7-y}$ system
H.D. Yang, P.F. Chen, C.R. Hsu and H.C. Ku 1193

*5.7. HTS: microwave properties*

Microwave conductivity of powdered unaligned $YBa_2Cu_3O_{7-\delta}$
H.M. Cheah, A. Porch and J.R. Waldram 1195

Microwave response of aligned $YBa_2Cu_3O_{7-\delta}$ powders
A. Porch, H.M. Cheah and J.R. Waldram 1197

Microwave and static conductivity of cobalt doped $Y_1Ba_2Cu_3O_{7-\delta}$ in the normal state
A. Porch, J.R. Cooper, H.M. Cheah, J.S. Edmends and J.R. Waldram 1199

*5.8. Transport properties in superconductors*

Thermal conductivity, electrical resistivity and specific heat of $La_{1.85}Sr_{0.15}CuO_4$ superconductor
K. Mori, K. Noto, Y. Ogiso, T. Igarashi, Y. Isikawa and K. Sato 1201

Transport properties of Bi-ceramic samples
V.B. Efimov, L.P. Mezhov-Deglin and S.A. Shevchenko 1203

Thermal properties of the superconductive Sm–Ba–Cu–O
Š. Molokáč, K. Flachbart, J. Bischof and A. Belling 1205

Thermoelectric power measurements on $Tl_2Ba_2CaCu_2O_8$ single crystal
S.-y. Lin, L. Li, D.-l. Zhang, H.-m. Duan and A.M. Hermann 1207

Thermoelectric power of highly oriented $Tl_2Ba_2Ca_2Cu_3O_x$ thin films
H. Zhang, H. Ma, S. Yan, S. Liang, L. Wang and S. Yan 1209

Anisotropic thermoelectric power of $Bi_2Sr_2Ca_1Cu_2O_8$ single crystal
L.M. León and R. Escudero 1211

Thermoelectric power of high-$T_c$ superconductor $CaBaACu_3O_y$ with A=Y and lanthanide
Y.W. Park, H. Park, Y.S. Song, H.C. Lee and M.S. Jang 1213

Superconductivity and electron transport in amorphous (Zr–Ni)–Al alloys
D.G. Naugle, G. Agnolet, C.L. Wang, K. Rhie, A.B. Kaiser and A.K. Bhatnagar 1215

Nernst effect in high-$T_c$ superconducting films
F. Kober, R.P. Huebener, H.-C. Ri, T. Sermet, A.V. Ustinov, M. Zeh, J. Mannhart, R. Gross and A. Gupta 1217

Nernst effect in a high temperature superconductor
H. Lengfellner, A. Schnellbögl, J. Betz, W. Prettl and K.F. Renk 1219

*5.9. HTS: photoemission and spectroscopy*

Nature and origin of the Fermi-liquid states in $Bi_2Sr_2CaCu_2O_8$ studied by photoemission and inverse photoemission
T. Takahashi, H. Matsuyama, K. Kamiya, T. Watanabe, K. Seki, H. Katayama-Yoshida, S. Sato and H. Inokuchi 1221

Photoelectron spectroscopic observation of metal–nonmetal transition in $Bi_2Sr_2Ca_{1-x}Cu_2O_y$ system
R. Itti, F. Munakata, K. Ikeda, N. Koshizuka and S. Tanaka 1223

Photoemission spectroscopic study of copper-oxide superconductors and related materials
H. Eisaki, T. Ido, H. Takagi, S. Uchida, T. Mizokawa, H. Namatame, A. Fujimori, Y. Tokura, J. van Elp, P. Kuiper, G.A. Sawatzky, S. Hosoya, H. Katayama-Yoshida, K. Oka and H. Unoki 1225

XPS measurements in $Bi_2Sr_2Ca_{1-x}Y_xCu_2O_{8+\delta}$
H. Takauchi, H. Enomoto, J.S. Shin, H. Yamanaka, H. Furukawa, Y. Takano, N. Mori and H. Ozaki 1227

The cooperative effect of electronic structures in high-$T_c$ superconductor $YBa_2Cu_3O_{7-\delta}$ system
Y. Zhang, M. Ji and L. Chen 1229

Observation of the superconducting gap in $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystals by Raman spectroscopy
M. Boekholt and G. Güntherodt 1231

Far-infrared spectra of Nd-based high temperature superconductors
B.P. Clayman, S.H. Wang and Q. Song 1233

Lattice dynamics and the far infrared spectra of $Pr_xNd_{1-x}Ba_2Cu_3O_{7-y}$ and $Pr_xY_{1-x}Ba_2Cu_3O_{7-y}$
S. Onari, A. Ono, T. Arai and T. Mori 1235

Phonon spectra of HTC superconductors: a comparative inelastic neutron scattering study of the system $(Y_{1-x}Ca_x)(Ba_{2-y}La_y)Cu_3O_{7-\delta}$
B. Renker, F. Gompf, P. Adelmann, D. Ewert and H. Mutka 1237

Bonding states in the $CuO_2$-plane of the layered cuprates
S. Tajima, S. Ishibashi, T. Itoh, H. Eisaki, H. Takagi, T. Arima, Y. Mizuo, Y. Tokura and S. Uchida 1239

Superconductivity of $BaPb_{1-x}Bi_xO_3$ and $Ba_xK_{1-x}BiO_3$ in the coexisting state of itinerant large polarons and localized small bipolarons
S. Sugai, Y. Enomoto and T. Murakami 1241

Study of infrared spectra of N-type superconductor Nd–Ce–Cu–O system
Z. Xianyu, C.J. Li, Q.L. Hu, J.H. Sun, W.Z. Wang and G. Yuan 1243

Phonon characterization of $YBa_2Cu_3O_{7-\delta}$ doped with Al and Ga by Raman spectroscopy
M. Kakihana, L. Börjesson and S. Eriksson 1245

Effect of Sr and Co doping on structure and phonon Raman spectra of $YBa_2Cu_3O_{7-\delta}$
M. Kakihana, L. Börjesson and S. Eriksson 1247

Optical study of the electronic state in $La_{2-x}Sr_xCuO_4$
S. Uchida, T. Ido, H. Takagi, T. Arima, Y. Tokura and S. Tajima 1249

The optical properties of the doped holes in $Bi_2Sr_2(Ca, Nd)Cu_2O_{8+\delta}$
I. Terasaki, T. Nakahashi, S. Takebayashi, A. Maeda and K. Uchinokura 1251

Far-infrared reflectivity and absorptivity of $YBa_2Cu_3O_{7-\delta}$ thin films
K.F. Renk, J. Schützmann, A. Prückl, B. Roas, L. Schultz and G. Saemann-Ischenko 1253

Optical measurement for thin films of Bi–Sr–Ca–Cu–O systems
K. Hirochi, K. Setsune, S. Hayashi, K. Mizuno, T. Matsushima, Y. Ichikawa, H. Adachi and K. Wasa 1255

Scaling of an infrared absorption with $T_c$ in a cuprate superconductor
G.A. Thomas, S.L. Cooper, J. Orenstein, D.H. Rapkine, J.V. Waszczak and L.F. Schneemeyer 1257

Infrared anomaly, local itinerant carriers and superconductivity in $YBa_2(Cu_{1-x}Co_x)_3O_{7-\delta}$
N. Ogita, H. Tukamoto, M. Udagawa and K. Ohbayashi 1259

Infrared anomaly and superconductivity in $(La_{1-x}M_x)_2(Cu_{1-y}N_y)O_4$: M=Ca, Sr, Ba; N=Ni, Zn
M. Udagawa, H. Tukamoto, N. Ogita and K. Ohbayashi 1261

Spins and carriers in oxide superconductors studied by Raman scattering
S. Sugai, M. Sato, T. Ito, T. Ido, H. Takagi, S. Uchida, T. Kobayashi, J. Akimitsu, Y. Hidaka, T. Murakami, S. Hosoya, T. Kajitani and T. Fukuda 1263

Soft X-ray absorption study of $R_2CuO_{4-x}$
E. Lederman, P. van Aken, M.L. den Boer and S. Horn 1265

Infrared reflectivity of high-$T_c$ superconductors
J. Ruvalds and A. Virosztek 1267

AC losses and submillimeter absorption in single crystals $La_2CuO_4$
S.V. Varyukhin, A.A. Zakharov, E.M. Gershenzon, G.N. Gol'tsman, N.G. Ptitsyna and G.M. Chulkova 1269

*5.10. HTS: ultrasonic measurements*

Evidence for coexistence of ferroelectricity and high-$T_c$ superconductivity in $YBa_2Cu_3O_{7-\delta}$ ($\delta$ <0.15) from ultrasonic experiments
V. Müller, C. Hucho, D. Maurer, K. de Groot and K.H. Rieder 1271

Sound attenuation in the mixed state of high-$T_c$ superconductors
J. Pankert 1273

Ultrasonic attenuation in high-$T_c$ superconductors: a new approach to the problem of flux pinning
P. Lemmens, P. Fröning, S. Ewert, J. Pankert, H. Passing and A. Comberg 1275

Effect of magnetic field on the transition temperature of high $T_c$ superconductors in sound velocity measurements
Y. Horie, T. Fukami and S. Mase 1277

Sound velocity in $Bi_2Sr_2CaCu_2O_8$ single crystals
M. Saint-Paul, J.L. Tholence, H. Noel, J.C. Levet, M. Potel and P. Gougeon 1279

Ultrasonic investigation of the high $T_c$ superconducting $Ba_{1-x}K_xBiO_3$ system
M.-F. Xu, Y.J. Qian, K.J. Sun, Y. Zheng, Q. Ran, D. Hinks, B.K. Sarma and M. Levy 1281

Ultrasonic investigations of the layered perovskite ceramic superconducting systems
Y. He, J. Xiang, S. Jin, A. He and J. Zhang 1283

Acoustical properties of $La_{2-x}Sr_xCuO_4$ single crystals
J.Y. Prieur, H. Ji, J. Joffrin, M. Chapellier, G. Chardin, H. Kitazawa and K. Katsumata 1285

Longitudinal velocity and attenuation of ultrasound in $Bi_2Sr_2CuO_{6+x}$
J. Dominec, C. Laermans and V. Plecháček 1287

Ultrasonic studies of structural phase transitions and superconductivity in $La_{2-x}Ba_xCuO_{4-\delta}$ and $La_{2-x}Sr_xCuO_{4-\delta}$
T. Fukase, T. Nomoto, T. Hanaguri, T. Goto and Y. Koike 1289

Ultrasonic anomalies in N-type superconducting $Nd_{2-x}Ce_xCuO_{4-y}$ compounds
Y. He and X. Sun 1291

On the structural and elastic aspects of $La_{2-x}(Sr, Ba)_xCuO_{4-y}$ superconductors: Landau theory
W. Ting, K. Fossheim and T. Lægreid 1293

*5.11. HTS: magnetic resonance and Mössbauer studies*

Evidence for Fermi liquid excitation in $Tl_2Ba_2CuO_{6-y}$
K. Fujiwara, Y. Kitaoka, K. Asayama, Y. Shimakawa, T. Manako, Y. Kubo and A. Endo 1295

Cu-NMR study on electronic state in electron doped $Ln_{2-x}Ce_xCuO_4$ (Ln=Nd, Pr, Sm and Eu)
K.-i. Kumagai, M. Abe, S. Tanaka, Y. Maeno, T. Fujita and K. Kadowaki 1297

Nuclear spin–lattice relaxation of $^{139}La$ in $(La_{1-x}Sr_x)_2CuO_4$
T. Kobayashi, S. Wada and Y. Yamada 1299

Korringa behavior for Cu(2) in $YBa_2Cu_3O_{6.98}$
Y.-Q. Song, M. Lee, N. Tea, F. D'Orazio, S. Bhattacharja, W.P. Halperin, J. Thiel, K.R. Poeppelmeier, U. Welp, G.W. Crabtree and M.M. Fang 1301

Cu-NQR study of electric field gradient and nuclear spin relaxation in $La_{2-x}Sr_xCuO_{4-y}$
Y. Nakamura and K.-i. Kumagai 1303

Influence of magnetic fields on NQR line shape parameters in oriented $YBa_2Cu_3O_{7-\delta}$ powder samples
H. Riesemeier, H. Kamphausen, E.-W. Scheidt, M. Schaefer and K. Lüders 1305

Cu NQR and Pb NMR in the superconducting $Pb_2Sr_2Y_{1-x}Ca_xCu_3O_{8+\delta}$
T. Kohara, K.-i. Ueda, H. Takenaka, Y. Kohori and Y. Oda 1307

Spin correlation in $(La_{1-x}Sr_x)_2CuO_4$ – $^{63}Cu$ NQR study
Y. Kitaoka, K. Ishida, K. Kondo and K. Asayama 1309

Spin–lattice relaxation, NQR $^{63}Cu$ and NMR $^{205}Tl$, $^{17}O$ in $Tl_2Ba_2Ca_nCu_{n+1}O_{6+n}$ (n=0, 1, 2)
S.V. Verkhovskii, Yu.I. Zhdanov, K.N. Mikhalyov, B.A. Aleksashin, V.I. Ozhogin, A.Yu. Yakubovskii and L.D. Shustov 1311

$^{139}La$ NQR study of antiferromagnetic $La_2NiO_{4+\delta}$ and $La_2CoO_{4-\delta}$
S. Wada, T. Kobayashi, M. Kaburagi, T. Kajitani, S. Hosoya, T. Fukuda, S. Onodera, Y. Yamada, K. Shibutani and R. Ogawa 1313

The Gd ESR measurements in $GdBa_2(Cu_{1-x}M_x)_3O_y$ (M=Ni, Co and Fe) compounds
F. Nakamura, Y. Ochiai, H. Shimizu and Y. Narahara 1315

Absence and existence of ESR in high-$T_c$ superconductors
Y. Hayashi, T. Yosida, N. Kontani, M. Fukui, S. Sako, T. Fujita, H. Sasakura, S. Minamigawa and K. Nakahigashi 1317

ESR of $Gd^{3+}$ in $Y_{1-x}Gd_xBa_2Cu_3O_7$ powders and single crystals: results and problems
A. Deville, B. Gaillard, L. Bejjit, O. Monnereau, H. Noel and M. Potel 1319

Detection and investigation of AFMR in $Gd_2CuO_4$ and $GdBa_2Cu_3O_x$
A.I. Zvyagin, M.I. Kobets, V.A. Pashchenko, A.A. Stepanov and E.N. Khats'ko 1321

Distribution of iron over copper sites in $GdBa_2(Cu_{1-x}Fe_x)_3O_{7-\delta}$
H.J. Bornemann, R. Kmiec and G. Czjzek 1323

151-Eu Mössbauer effect study of $Pb_2Sr_2Eu_{0.3}Ca_{0.7}Cu_3O_{8+z}$ superconductor
P.P. Vaishnava, C.D. Nelson, W.P. Pratt Jr. and P. Boolchand 1325

Softening of Cu(1)-site vibration at the onset temperature of high-$T_c$ superconducting transition
T. Nishida, M. Katada and Y. Matsumoto 1327

*5.12. HTS: heat capacity*

Specific heat of the high-$T_c$ superconductors $Bi_2Sr_2Ca_{n-1}Cu_nO_{2n+4}$ ($n$=1, 2, 3) from 0.4 to 6 K
S.J. Collocott, R. Driver and C. Andrikidis 1329

Low temperature specific heat of $Nd_2CuO_4$ and $Nd_2CuO_{4-x}F_x$
A. Tigheza, R. Kuentzler, G. Pourroy, Y. Dossmann and M. Drillon 1331

The specific heat of superconducting $TmBa_2Cu_3O_{7-x}$ and $YBa_2Cu_3O_{7-x}$ below 1 K; large influence of impurities
R.W. Willekers, H.C. Meijer, G. Rietveld, F. Mathu and H. Postma 1333

Specific heat of the superconductor $YBa_2Cu_4O_8$ from 1.5 to 300 K
A. Junod, T. Graf, D. Sanchez, G. Triscone and J. Muller 1335

Specific heat of $La_{2-x}Sr_xCuO_4$: volume fraction of superconductivity; possible structural transition at 45 K
A. Amato, R.A. Fisher, N.E. Phillips and J.B. Torrance 1337

Specific heat of a multiphase superconductor $Bi_{1.71}Pb_{0.43}Sr_{1.71}Ca_{2.14}Cu_3O_{10.29}$
M.K. Yu, J.P. Franck and S. Gygax 1339

Temperature linear term and jump at $T_c$ in the heat capacity of $La_{2-x}Sr_xCuO_4$
N. Wada, T. Obana, Y. Nakamura and K.-i. Kumagai 1341

Anisotropic specific heat behaviour under magnetic field of single crystal $YBa_2Cu_3O_7$
E. Bonjour, R. Calemczuk, J.Y. Henry and A.F. Khoder 1343

Direct observation of Cu spin moments by the nuclear heat capacity in $La_{2-x}M_xCuO_4$ (M=Sr and Ba)
N. Wada, S. Ohsawa, Y. Nakamura and K.-i. Kumagai 1345

Specific heat of $(Y_{1-x}Pr_x)Ba_2Cu_3O_7$: magnetic ordering; magnetic hyperfine fields
A. Amato, R. Caspary, R.A. Fisher, N.E. Phillips, H.B. Radousky, J.L. Peng, L. Zhang and R.N. Shelton 1347

Low-temperature tetragonal phase and electronic coefficient of specific heat in $(La_{1-x}Ba_x)_2CuO_4$
Y. Okajima, K. Yamaya, M. Oda and M. Ido 1349

Electrical resistivity and specific heat of $La_{2-x}Sr_xNiO_{4+\delta}$
A. Matsushita, T. Matsumoto, S. Takayanagi and N. Mōri 1351

Grain size-dependence of the specific heat of $YBa_2Cu_3O_7$-sinters
B. Lemire, K. Neumaier and K. Andres 1353

*5.13. Superconducting fluctuations – mostly HTS*

A study of magnetoresistive transition in high-$T_c$ phase Bi–Pb–Sr–Ca–Cu–O thin film
A.A.A. Youssef, T. Fukami, Y. Horie and S. Mase 1355

Superconducting fluctuations of thin aluminium films with magnetic impurities
E. Spahn and K. Keck 1357

Theoretical explanation of broad resistive transition in high temperature superconductors in magnetic field
R. Ikeda, T. Ohmi and T. Tsuneto 1359

Fluctuation-enhanced conductivity of high quality $YBa_2Cu_3O_{7-\delta}$ single crystals
G. Kumm and K. Winzer 1361

Broadening of the resistive transition investigated by the conductance-fluctuation measurement
A. Maeda, Y. Kato, H. Watanabe, I. Terasaki and K. Uchinokura 1363

Magnetoresistance measurements on sintered $YBa_2Cu_3O_{7-\delta}$
M. Andersson and Ö. Rapp 1365

On the extraction of the paraconductivity from the resistivity data in cuprate oxide superconductors
J.A. Veira, C. Torron, J. Maza and F. Vidal 1367

Anomalous peaks in the thermopower of single crystal $YBa_2Cu_3O_{1-x}$
A.J. Lowe, S.E. Regan and M.A. Howson 1369

Excess electrical conductivity in Bi–Sr–Ca–Cu–O compounds
J.J. Wnuk, L.W.M. Schreurs, P.J.T. Eggenkamp and P.J.E.M. van der Linden 1371

Thermodynamic fluctuation in the Bi(Pb, Sb)–Sr–Ca–Cu–O superconductors
M. Akinaga and L. Rinderer 1373

Current enhanced two-level fluctuator noise in high-$T_c$ thin films
G. Jung, M. Bonaldi, J. Konopka and S. Vitale 1375

*5.14. Critical currents and magnetic properties in films, crystals and granular materials – mostly HTS*

Resistance noise at the superconducting transition in thick films of $YBa_2Cu_3O_{7-\delta}$
J.M. Aponte, G. Gutiérrez and M. Octavio 1377

Magnetization study of YBaCuO prepared by quench and melt growth process
S. Gotoh, M. Murakami, N. Koshizuka and S. Tanaka 1379

Peak-effect in HTSC ceramics at a low magnetic field
L.M. Fisher, N.V. Il'in, N.A. Podlevskikh and S.I. Zakharchenko 1381

Transport properties of Ag–Y123 fibers prepared using the polymer–metal precursor technique
W.M. Tiernan, R.B. Hallock, J.C.W. Chien, B.M. Gong, S.H. Dong and Y.S. Yang 1383

The influence of additives on the current carrying capacity of bulk $YBa_2Cu_3O_x$
A.R. Kuper, P. Hoogendam, H. Hemmes, B.H. Kolster and L.J.M. van de Klundert 1385

Flux distribution in polycrystalline $YBa_2Cu_3O_7$
P. Leiderer, P. Brüll, T. Klumpp and B. Stritzker 1387

Flux penetration into a weakly coupled Josephson network: $Nd_{1.85}Ce_{0.15}CuO_4$
H. Veith, R. Kleiner, T. Koch, P. Müller and K. Andres 1389

Flux penetration and magnetization in superconducting $(YBaCuO)_{1-x}Ag_x$ tubular samples, with $x$=0 and 0.1
E. Holguin, H. Berger and J.F. Loude 1391

Geometry-dependent flux-penetration and pinning in $Y_1Ba_2Cu_3O_7$ superconductor
M.A.-K. Mohamed, J. Jung and J.P. Franck 1393

Granular behavior of the $PbMo_6S_8$ Chevrel phase
M. Decroux, D. Cattani, J. Cors, S. Ritter and Ø. Fischer 1395

Magnetic study in high-$T_c$ superconducting oxides by AC-complex magnetic susceptibility
K. Okuda, S. Noguchi, M. Yoshikawa, N. Imanaka, H. Imai and G. Adachi 1397

The influence of viscous flux flow on AC losses of high-$T_c$ superconductors
S. Takács, F. Gömöry and P. Lobotka 1399

Study of critical current density in $(Tl_{0.5}Pb_{0.5})Ca_2Sr_2Cu_3O_y$
M.F. Tai, Y.K. Tu and I.C. You 1401

Paracoherence studies in $Tl_2CaBa_2Cu_2O_8$, $CaLaBaCu_3O_{7-y}$ and $CaSmBaCu_3O_{7-y}$
H. Krishnan, V. Sankaranarayanan and R. Srinivasan 1403

Low frequency noise measurement in $YBa_2Cu_3O_x$ thick films
K.-H. Yoo and J.C. Park 1405

Magnetic characters of polycrystalline TlBaCaCuO superconductor
S.-y. Ding, Z. Yu and L. Qiu 1407

Intrinsic critical current densities of $PbMo_6S_8$
D. Cattani, J. Cors, M. Decroux and Ø. Fischer 1409

Axial anisotropy of intergrain critical current in Bi–Pb–Sr–Ca–Cu–O
T. Umemura, K. Egawa, M. Wakata, K. Yoshizaki, B. Ni and T. Matsushita 1411

Magnetization measurements in epitaxial films of $YBa_2Cu_3O_y$ compound
H. Obara, S. Kosaka, M. Umeda and Y. Kimura 1413

Large, orientation-dependent enhancements of critical currents in $Y_1Ba_2Cu_3O_{7-x}$ epitaxial thin films: evidence for intrinsic flux pinning?
D.K. Christen, C.E. Klabunde, R. Feenstra, D.H. Lowndes, D. Norton, J.D. Budai, H.R. Kerchner, J.R. Thompson, L.A. Boatner, J. Narayan and R. Singh 1415

Critical currents in superconducting $HoBa_2Cu_3O_{7-\alpha}$ films
D.-M. Zhu and W.-Y. Guan 1417

Nonlinear conduction phenomena in superconducting state of $Bi_2Sr_2CaCu_2O_8$ films
T. Fukami, T. Kamura, Y. Horie and S. Mase 1419

The role of grain boundary in the normal-state transport properties of CVD-grown Bi–Sr–Ca–Cu–O films
C. Tanaka, T. Nakamura, H. Yamawaki, T. Kimura and M. Ihara 1421

Anisotropy of superconducting properties of Bi–Sr–Ca–Cu–O thin films
H. Raffy, S. Labdi, O. Laborde and P. Monceau 1423

An anomaly in the angular dependence of critical current densities of niobium films
G.-i. Oya and Y. Sawada 1425

Anisotropic magnetic properties of superconducting tetragonal $HoBa_2Cu_3O_{7-\delta}$
H. Arabi, M. Clamp, O. Mills, J.W. Ross and D.J. Sandiford 1427

AC susceptibility of single-crystalline $YBa_2Cu_3O_7$ and $Bi_2Sr_2CaCu_2O_8$ in magnetic field up to 6 T
J.N. Li, K. Kadowaki, M.J.V. Menken, A.A. Menovsky and J.J.M. Franse 1429

$H_{c2}$ of disordered $Hf_{67}Ni_{33}$ and $Hf_{67}Co_{33}$; deviations from WHH theory
A. Nordström and Ö. Rapp 1431

Angular dependence of critical fields in as grown Y–Ba–Cu–O films
H.C. Yang, H.H. Sung and H.E. Horng 1433

Low temperature properties of the $YBA_2Cu_4O_{8\pm\delta}$ superconducting phase
G. Triscone, T. Graf, A. Junod, D. Sanchez and J. Muller 1435

Flux trapping and spontaneous magnetism in small particles of a high temperature superconductor
T.J. Jackson, M.N. Keene, W.F. Vinen and P. Gilberd 1437

Studies on upper critical field of TlBaCaCuO superconductor
Z. Yu, S.-y. Ding and L. Qiu 1439

Initial magnetization of sintered-bulk and Ag-shiethed tape of Bi(Pb)–Sr–Ca–Cu–O
A. Oota, H. Noji, A. Yata, K. Hayashi and K. Ohba 1441

Lower critical field of single crystal $Y(Gd6\%)Ba_2Cu_3O_{6.83}$
A. Gupta, P. Esquinazi and H.F. Braun 1443

Magnetic anisotropy in monodomain crystals of $YBa_2Cu_3O_7$
K. Schönmann, B. Seebacher and K. Andres 1445

Flux penetration field in $Y_1Ba_2Cu_3O_7$ single crystals nearby $T_c$
V.N. Zavaritsky and N.V. Zavaritsky 1447

Anisotropy of upper critical field in the $(1\,1\,0)_t$ and $(0\,0\,1)_t$ planes for single-crystal $La_{1.86}Sr_{0.14}CuO_4$
T. Hanaguri, T. Fukase, Y. Koike, I. Tanaka and H. Kojima 1449

Magnetization anisotropy of high-$T_c$ superconductors
M. Tuominen, A.M. Goldman, Y.Z. Chang and P.Z. Jiang 1451

Evidence of weak pair coupling in the penetration depth of Bi-based high-$T_c$ superconductors
J.R. Thompson, D.K. Christen, Y.R. Sun, B.C. Chakoumakos, B.C. Sales, H.R. Kerchner, J.G. Ossandon and E. Sonder 1453

Magnetic susceptibility of single crystalline $Bi_2Sr_2CaCu_2O_{8+\delta}$
K. Kadowaki, J.J.M. Franse, S. Yamaguchi and S. Takagi 1455

*5.15. Superconducting thin films*

The onset of superconductivity in ultrathin amorphous metal films
D.B. Haviland, Y. Liu, B. Nease and A.M. Goldman 1457

AC-to-DC rectification and macroscopic quantum interference in percolating superconducting films
A. Gerber and G. Deutscher 1459

Superconducting properties of granular films built from well-defined, crystalline Bi-clusters
B. Weitzel and H. Micklitz 1461

Onset superconductivity in ultrathin $DyBa_2Cu_3O_7$ films
T. Wang, K.M. Beauchamp, D.D. Berkley, J.-X. Liu, B.R. Johnson and A.M. Goldman 1463

Ultra-thin film superconductors of artificially synthesized Au/Ge layers
Y. Seguchi, T. Tsuboi and T. Suzuki 1465

Radiation response of magnetron sputtered NbN films
R. Herzog, H.W. Weber, R.T. Kampwirth, K.E. Gray and H. Gerstenberg 1467

Superconducting properties of amorphous $Nb_{1-x}Ni_x$ films
Y. Kuwasawa, K. Wazumi, Y. Kamata, T. Watanaba and S. Nakano 1469

Statics of the intermediate and two-dimensional mixed states in type I superconducting films
A. Favre, E. Holguin, B. Dutoit and L. Rinderer 1471

In-plane orientation and superconductivity of in-situ DC sputtered $YBa_2Cu_3O_7$ films
M.G. Karkut, A. Perrin, M. Guilloux-Viry, O. Peña, J. Padiou and M. Sergent 1473

Fabrication of in-situ superconducting thin films of (Y, Tm)–Ba–Cu–O on $SrTiO_3$, $NdAlCaO_4$ and $LaGaO_3$ substrates
P. Przysłupski, L.T. Baczewski, M. Berkowski, H. Adrian, C. Tome-Rosa and G. Jakob 1475

Preparation, patterning and critical current density of $YBa_2Cu_3O_{7-\delta}$ thin films
C. Tome-Rosa, A. Walkenhorst, M. Maul, G. Jakob, H. Adrian, K. Haberle, P. Przysłupski and G. Adrian 1477

Optimum annealing temperature dependence on initial lead content in DC magnetron sputtered Bi(Pb)–Sr–Ca–Cu–O thin films
W. Kula, R. Sobolewski and S.J. Lewandowski 1479

Sputtering synthesis of as-grown superconducting BiSrCaCuO thin film with single high-$T_c$ phase
H. Yamamoto, N. Katoh, K. Satoh, T. Nakamura and M. Tanaka 1481

As-grown Bi(Pb)SrCaCuO thin films formed by RF sputtering in atmosphere of $N_2O/O_2$ mixtures
K.-i. Kuroda, K. Kojima, M. Tanioku, K. Yokoyama, H. Kuroki and K. Hamanaka 1483

Superconducting and structural properties of highly textured $Bi_2Sr_2Ca_1Cu_2O_x$ thin films
P. Gierłowski, J. Górecka, R. Sobolewski and S.J. Lewandowski 1485

Sn doped Bi–Sr–Ca–Cu–O thin film
Z. Zhao and P. Yang 1487

Conducting property of epitaxial CuO film prepared by reactive sputtering
T. Nakamura, H. Yamamoto and M. Tanaka 1489

Investigations on a single source deposition process for YBaCuO films
A. Thierauf and K. Keck 1491

Highly oriented $Y_1Ba_2Cu_3O_7$ thin films prepared in situ by vacuum co-evaporation
Š. Chromik, V. Štrbík, F. Hanic, V. Šmatko, R. Adam and Š. Beňačka 1493

Epitaxial $Y_1Ba_2Cu_3O_{7-x}$ and $Y_2Ba_4Cu_8O_{16-x}$-films using the $BaF_2$-method
S. Dina, M. Moske, G.V. Minnigerode and K. Samwer 1495

In situ growth of high temperature superconductor thin films with evaporation techniques using ozone as an oxygen source
H.M. Appelboom, J.P. Adriaanse, H.I. de Groot, G. Rietveld, D. van der Marel and J.E. Mooij 1497

Annealing effects on growth of high-$T_c$ phase in BiSrCaCuO screen printed film
N. Khare, S. Chaudhry, A.K. Gupta, V.S. Tomar and V.N. Ojha 1499

Preparation of Bi–Sr–Ca–Cu–O superconducting films by the liquid phase epitaxial method
J.S. Shin, H. Enomoto, S. Kanematsu, Y. Takano, N. Mori and H. Ozaki 1501

Properties of homogeneous $Y_{1-x}Pr_xBa_2Cu_3O_7$ alloy thin films prepared using layer by layer growth
A.D. Kent, J.-M. Triscone, L. Antognazza, O. Brunner, Ch. Renner, Ph. Niedermann, M.G. Karkut and Ø. Fischer 1503

Low temperature scanning tunneling spectroscopy of a $DyBa_2Cu_3O_{7-x}$ film
J.-C. Wan, K.A. McGreer, K.M. Beauchamp, B.R. Johnson, J.-X. Liu, T. Wang and A.M. Goldman 1505

Relaxation processes in optically excited high-$T_c$ films
A.M. Kadin, P.H. Ballentine and W.R. Donaldson 1507

*5.16. Superconductivity: materials and structural properties*

Multiphase behavior and the superconducting composition in $Nd_{2-x}Ce_xCuO_4$
J.D. Jorgensen, D.G. Hinks, P. Lightfoot, D.R. Richards, B. Dabrowski, S. Pei, D.T. Marx, A.W. Mitchell and Y. Zheng 1509

Investigation of peculiarities of HTSC electron states with radiation disorder
S.A. Davydov, A.E. Karkin, A.V. Mirmelstein, V.I. Voronin and B.N. Goshchitskii 1511

Optimization of $T_c$ and $J_c$ in sputtered YBCO films
J.R. Gavaler and J. Talvacchio 1513

Properties of superconductors under low temperature deformation: role of twins
V.S. Bobrov, M.A. Lebyodkin and S.N. Zorin 1515

Surprising behaviour of resistivity of two macrocrystalline samples of Zr-doped $SrTiO_3$ between 170 K and 100 mK
C. Andrikidis, R.J. Tainsh and D.M. Eagles 1517

Resistivity and superconductivity of uranium based metallic glasses
E.-W. Scheidt, H. Riesemeier, K. Lüders, M. Robrecht and J. Hasse 1519

The critical field of $PbMo_6S_8$ measured by specific heat up to 14 T
J. Cors, D. Cattani, M. Decroux, A. Stettler and Ø. Fischer 1521

New isotope effects on superconducting compounds, $V_2ZrH_x$, $V_2ZrD_x$, and $V_2ZrT_x$ ($0 \leq x \leq 0.11$)
K. Mori, Y. Isikawa, K. Sato, K. Ashida and K. Watanabe 1523

Thin amorphous superconducting niobium–silicon films with high normal state resistivity
H.S.J. van der Zant, J.F. Jongste, H.W. Zandbergen and J.E. Mooij 1525

Superconductivity and metal–insulator transition in zinc-substituted $La_{1.85}Sr_{0.15}CuO_4$
M.Z. Cieplak, G. Xiao, S. Guha, D. Doatch, H. Kojima and P. Lindenfeld 1527

Hydrogen absorption in $La_{2-x}Sr_xCuO_4$ with mono-layer $CuO_6$ octahedra
T. Ekino, K. Matsukuma, T. Takabatake and H. Fujii 1529

Carrier concentration dependence of doping effects and the critical concentration of metal–insulator transition in $La_{2-y}Sr_yCu_{1-x}Ni_xO_4$
M. Sato, H. Fujishita and M. Sera 1531

Electrical and magnetic properties of $La_2NiO_4$ doped by Na and K
S.K. Tolpygo, V.S. Melnikov, I.G. Mikhailov, A.E. Morozovsky, V.M. Pan, N.P. Pshentzova, A.Yu. Khramov and S.K. Yushchenko 1533

Superconducting and normal state properties of $Nd_{1.85}Ce_{0.15}CuO_{4-y}$
J.W. Chen and W.-C. Chou 1535

Effect of Ce doping and oxygen deficiency in $Nd_{2-x}Ce_xCuO_{4-y}$
S. Uji and H. Aoki 1537

Anisotropy of the transport properties of $Nd_{2-x}Ce_xCuO_{4+y}$ single crystals at low temperatures
J.H. Ali, F.G. Aliev, I.V. Vodolazskaya, V.I. Voronkova, V. Kovacik and V.V. Moshchalkov 1539

n-doped superconducting compounds: granular and pressure effects
A. Gerber, J. Beille, T. Grenet and M. Cyrot 1541

$T_c$ suppression and hole concentration in Cu substituted $YBa_2(Cu_{1-x}M_x)_3O_{7-\delta}$ with Fe, Co, Ni, Zn
N. Kawaji, K. Muranaka, Y. Oda and K. Asayama 1543

Different origins of $T_c$-suppression in $YBa_2(Cu_{1-x}M_x)_3O_y$ (M=Co and Zn)
S. Terada, N. Kobayashi, H. Iwasaki, A. Tokiwa, M. Kikuchi, S. Syono and Y. Muto 1545

Hole generation and pair breaking as investigated in $Pr_{1-x}Ca_xBa_2Cu_3O_y$
K. Takita and T. Ohshima 1547

Hall effects and magnetotransport properties of the $Nd_{1+x}Ba_{2-x}Cu_3O_{7+y}$ system
T. Tamegai and Y. Iye 1549

Rare earth (RE) dependence and Ce-concentration dependence of $T_c$ in Bi-2222 phase $Bi_2Sr_2(RE_{1-x}Ce_x)_2Cu_2O_{10+y}$
T. Arima, Y. Tokura, H. Takagi, S. Uchida, R. Beyers and J.B. Torrance 1551

Density of states at Fermi energy and $T_c$ in $Bi_2Sr_2Ca_{1-x}Ce_xCu_2O_{8+y}$
A. Sawa, T.-S. Han, T. Iwamatsu, H. Uwe and T. Sakudo 1553

Superconducting properties of $Pb_2Sr_2Y_{1-x}Ca_xCu_3O_{8+\delta}$
Y. Koike, M. Masuzawa, H. Sunagawa, T. Noji, H. Kawabe, N. Kobayashi and Y. Saito 1555

Superconductivity and oxygen deficiency in $CaLaBaCu_3O_x$
T. Yagi, M. Domon, Y. Okajima and K. Yamaya 1557

Transport and magnetic properties of $Tl_2Ba_2CuO_6$ showing a phase transition from a non-superconducting normal metal to a 85 K superconductor
Y. Kubo, Y. Shimakawa, T. Manako and H. Igarashi 1559

Some superconducting properties of $(BaK)BiO_3$ system
D.S. Lee, M.H. Hsieh, H.E. Horng, H.C. Yang and H.C. Chen 1561

*5.17. Superconductivity: tunnelling, weak links and networks*

Atomic resolution STM/STS on oxide superconductors down to 4.2 K
T. Hasegawa, M. Nantoh, H. Suzuki, N. Motohira, K. Kishio and K. Kitazawa 1563

Superconductivity and current–voltage characteristic of a YBCO/Ag/Pb junction
K. Mizushima, K. Kubo, H. Kubota, M. Sagoi, T. Terashima, T. Miura and J. Yoshida 1565

Energy gaps and phonon structures in tunneling spectra of $Bi_2Sr_2Ca_1Cu_2O_{8+x}$ and $Bi_2Sr_2Ca_2Cu_3O_{10+y}$ superconductors
R. Koltun, M. Hoffmann, P.C. Splittgerber-Hünnekes, G. Güntherodt, V.V. Moshchalkov and L.I. Leonyuk 1567

Experiments and simulations on Josephson junction ladder arrays
H. Eikmans, J.E. van Himbergen, H.S.J. van der Zant, K. de Boer and J.E. Mooij 1569

Observation of integer and fractional giant Shapiro steps in arrays of SNS Josephson junctions
H.C. Lee, D.B. Mast, R.S. Newrock, L. Bortner, K. Brown, F.P. Esposito, D.C. Harris and J.C. Garland 1571

Superconductive proximity-effects in Nb on InGaAs-based heterostructures
L.H. Greene, A. Kastalsky, J.B. Barner and R. Bhat 1573

*I–V* characteristics of a circularly symmetric annular Josephson junction (CSAJJ) – I
W. Wang, A.L. Thomson and X. Yao 1575

*I–V* characteristics of a circularly symmetric annular Josephson junction (CSAJJ) – II
W. Wang, A.L. Thomson and X. Yao 1577

Current–voltage characteristics of nonequilibrium double-barrier superconducting tunnel junctions
T.M. Klapwijk, D.R. Heslinga and M.G. Blamire 1579

Conductance studies on different types of Nb/Al, $AlO_x$(/Al)/Nb Josephson tunnel junctions
D.J. Adelerhof, E.P. Houwman, D. Veldhuis, J. Flokstra and H. Rogalla 1581

Extreme critical temperature enhancement of Al by tunneling in Nb/$AlO_x$/Al/$AlO_x$/Nb tunnel junctions
M.G. Blamire, E.C.G. Kirk, J.E. Evetts and T.M. Klapwijk 1583

Theory of even–odd step suppression in the RSJ model
M. Kvale, S.E. Hebboul and J.C. Garland 1585

Observation of quantum susceptance in superconducting tunnel junctions
Q. Hu, C.A. Mears, P.L. Richards and F.L. Lloyd 1587

Effect of coherent twin boundaries on the electron–phonon interaction in single crystals of tin
A.V. Khotkevich, I.K. Yanson, M.B. Lazareva, V.I. Sokolenko and Ya.D. Starodubov 1589

Influence of the electron spectrum dielectrization on the critical current of the Josephson medium $BaPb_{1-x}Bi_xO_3$
A.M. Gabovich, D.P. Moiseev, V.M. Postnikov, A.S. Shpigel and A.I. Voitenko 1591

Growth and tunneling spectroscopy of $YBa_2Cu_3O_{7-x}$/insulator/$YBa_2Cu_3O_{7-x}$ junctions
K. Hirata, K. Iijima, K. Yamamoto, K. Hayashi, T. Terashima and Y. Bando 1593

Normal–superconducting tunneling in bulk high-$T_c$ superconductors: charging effects and effect of energy gap asymmetries
R. Medina, J.M. Aponte and M. Octavio 1595

Spin interactions in high field superconductors of V and Al
Y. Seguchi, T. Tsuboi and T. Suzuki 1597

Superconducting energy gap in spinel compound $Li_{1+x}Ti_{2-x}O_4$ from electron tunneling
T. Ekino and J. Akimitsu 1599

Tunneling investigation of high-$T_c$ Bi-system films on $SrTiO_3$(1 1 0)
M. Suzuki, H. Nakano, S. Nicoud and L. Rinderer 1601

Tunneling measurements on the Y–Ba–Cu–O thin film junctions with artificial barrier
N. Furuyama, I. Iguchi, K. Shirai, T. Kusumori, H. Ohtake, S. Tomura and M. Nasu 1603

Temperature dependence of the chemical potential of high-$T_c$ superconductors
G. Rietveld, M.A. van Veenendaal, D. van der Marel and J.E. Mooij 1605

Microwave frequency and power dependence of critical current in microbridges of BiSrCaCuO films
V.N. Ojha, V.S. Tomar, A.K. Gupta, D.K. Walia, G.S.N. Reddy and N. Khare 1607

Hyper-vortices in granular superconducting thin film bridges
G.A. Ovsyannikov, Z.G. Ivanov, G. Brorsson and T. Claeson 1609

RF modulation of current steps in Josephson junctions in YBaCuO constrictions
T.J. Witt 1611

Dual temperature dependences of conductivity found in Bi–Sr–Ca–Cu–O thin films
T. Akeyoshi, T. Akiyama, H. Yashiro and M. Sugahara 1613

Temperature dependence of the differential conductance at a normal:superconductor interface
R.C. Reinertson, P.J. Dolan Jr., D.L. Craig and C.W. Smith 1615

Andreev scattering and density of states in weakly coupled superconductors
H. Plehn and R. Kümmel 1617

Observation of carrier reflection at superconductor–semiconductor boundary using a co-planar point contact injector
T. Nishino, M. Hatano, H. Hasegawa and U. Kawabe 1619

Observation of De Gennes–Saint-James oscillations in $YBa_2Cu_3O_7$/I/Pb junctions
A. Fournel and J.P. Sorbier 1621

Aspects of tunneling in high-$T_c$ superconductors: WKB revisited
H.J. van Schevicoven, D. Lenstra and A.Th.A.M. de Waele 1623

Studies of contacts to YBCO
H.W. Lean, E.J. Tarte and J.R. Waldram 1625

Anomalous interface resistance between oxide superconductors and noble metals
J.S. Tsai, I. Takeuchi, H. Tsuge, N. Matsukura and S. Miura 1627

Modulation of low-frequency Shapiro steps of superconducting proximity-effect junctions
S.E. Hebboul, D.C. Harris and J.C. Garland 1629

Local critical fields in proximity induced superconducting silver
P. Visani, A.C. Mota and A. Pollini 1631

$YBa_2Cu_3O_{7-\delta}$–Ag/Al–Pb superconducting proximity junctions: microwave investigation
M.A.M. Gijs, D. Scholten, Th. van Rooy and A.M. Gerrits 1633

Magnetic field behavior of 2D superconducting weakly coupled wire networks
H.S.J. van der Zant, M.N. Webster, J. Romijn and J.E. Mooij 1635

Anisotropy, disorder, and commensurability in superconducting networks
M.A. Itzler, C.W. Wilks and P.M. Chaikin 1637

Localized order parameter on superconducting wire networks
F. Yu, A.M. Goldman and R. Bojko 1639

Frustration effects in triangular Josephson junction arrays
R. Theron, J.B. Simond, J.L. Gavilano, Ch. Leemann and P. Martinoli 1641

Dimensionality crossover and magnetic field frustration in disordered proximity coupled arrays
D.C. Harris, S.T. Herbert and J.C. Garland 1643

Fractional giant Shapiro steps in 2D Josephson arrays
S.P. Benz, M.S. Rzchowski, M. Tinkham and C.J. Lobb 1645

Dynamical simulations of fractional giant Shapiro steps
S.P. Benz, J.U. Free, M.S. Rzchowski, M. Tinkham, C.J. Lobb and M. Octavio 1647

The plasma resonance in microwave-driven small Josephson tunnel junctions
T. Holst and J. Bindslev Hansen 1649

Nonlinear excitations in layered Josephson structures
Y.S. Kivshar and T.K. Soboleva 1651

Josephson current in mixed overlap/in-line long junctions
S. Pagano, B. Ruggiero, M. Russo and E. Sarnelli 1653

Experimental study of fluxon dynamics in long Josephson junctions with a regular lattice of inhomogeneities
A.V. Ustinov 1655

Quasiperiodic route to soft turbulence in long Josephson junctions
L.E. Guerrero and M. Octavio 1657

Chaos beyond the onset in AC-driven phase slip centers
R. Rangel and L.E. Guerrero 1659

Chaos in self-pumped resonator coupled Josephson junctions
H. Dalsgaard Jensen, A. Larsen and J. Mygind 1661

*5.18. HTS: materials, synthesis and structure*

Study of $(La_{1-x}M_x)_2CuO_{4+\delta}$ annealed in high pressure oxygen gas
Y. Oda, M. Yamada, K. Asayama, T. Kohara and Y. Yamada 1663

Effects of oxygen deficiency and substitution for copper in $Nd_{2-x}Ce_xCuO_{4-\delta}$
Y. Koike, A. Kakimoto, M. Yoshida, H. Inuzuka, T. Noji and Y. Saito 1665

Synthesis of high critical current $YBa_2Cu_4O_8$ submicron powders at one atmosphere pressure by the citrate-gel process
R.S. Liu, R. Janes, P.P. Edwards and A.M. Campbell 1667

Percolation behavior in a $YBa_2Cu_3O_7$–Ag composite system
J.J. Lin and T.-M. Chen 1669

Characterization and superconductivity of $YBa_2Cu_4O_8$ and $Y_2Ba_4Cu_7O_{14+x}$ and their intergrowths
T. Graf, G. Triscone, A. Junod and J. Muller 1671

Microstructure of a unidirectionally grown YBaCuO superconductor by the quench and melt growth process
M. Morita, K. Kimura, K. Doi, M. Kimura, K. Miyamoto and K. Sawano 1673

Stabilisation of high-$T_c$ superconducting phase in Bi(Pb)–Sr–Ca–Cu–O system
S.M.M.R. Naqvi, M.H. Khan, A.A. Qidwai, S.M. Zia-ul-Haque, F. Ahmed and S. Dabir H. Rizvi 1675

Influence of composition and long term annealing on the formation of the 110 K phase in the Bi–Pb–Sr–Ca–Cu–O system
G. Jakob, M. Huth, T. Becherer, M. Schmitt, H. Spille and H. Adrian 1677

Crystal growth of Bi–Sr–Ca–Cu–O superconductors by the KCl-flux method
T. Yasuda and S. Takano 1679

Deoxidation effects on $Bi_2Sr_2CaCu_2O_{8+y}$ high temperature superconductor
Y. Kimishima, H. Kitsutaka and J. Nakano 1681

Metal–superconductor–insulator transition in the $(Tl_{1-x}Pb_x)(Ca_{1-y}Y_y)Sr_2Cu_2O_{7-\delta}$ system
R.S. Liu, P.P. Edwards and P.T. Wu 1683

Crystal structure of $La_2Cu_{0.95}Co_{0.05}O_{4-\delta}$: a powder neutron diffraction study
A. Lappas, M.J. Rosseinsky and K. Prassides 1685

Neutron diffraction study of the Cu ferromagnet $La_4Ba_2Cu_2O_{10}$
N. Ogawa, F. Mizuno, H. Masuda, I. Hirabayashi, S. Tanaka, T. Mochiku, H. Asano and F. Izumi 1687

Structural transitions and superconductivity in $(La_{1-x}Ba_{x-y}Sr_y)_2CuO_4$
Y. Maeno, N. Kakehi, A. Odagawa and T. Fujita 1689

Effects of $WO_3$ mixing on the crystal structure and the superconductivity in YBCO
Y. Matsumoto, M. Mori and T. Yasuda 1691

Electron microscopy study of oxide superconductors
Z. Hiroi, Y. Ikeda, M. Takano and Y. Bando 1693

Cathodoluminescence microscopy of high-$T_c$ superconducting materials
J.H. Miller Jr. 1695

Local structure of Ni in $YBa_2(Cu_{0.967}Ni_{0.033})_3O_{7-\delta}$ determined by XAFS
J.B. Boyce, F. Bridges, T. Claeson, T.H. Geballe and J.M. Tarascon 1697

Electrical transport in dense, bulk $YBa_2Cu_4O_8$ produced by hot isostatic pressing
B.M. Andersson, B. Sundqvist, J. Niska, B. Loberg and K.E. Easterling 1699
(This paper belongs to section 5.14, and should have preceded the article starting on page 1387.)

List of contributors lxxi